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THE ZOOLOGIST:

A

POPULAR MONTHLY MAGAZINE

OF

NATURAL HISTORY,

AND

JOURNAL FOR RECORDING FACTS AND ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES, MOLLUSKS,
INSECTS, WORMS, ZOOPHYTES, &c.

THEIR HABITS, FOOD, RETREATS, OCCASIONAL APPEARANCE,
MIGRATIONS, NESTS AND YOUNG.

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Zoological Miscellany.

Men petrified into Marble.—A correspondent of the 'Melbourne Argus,' dating from Mia Mia Creek, January 4, 1863, writes,—"I have lately discovered, in a stony creek, fifteen miles from Castlemaine, the bodies of three aborigines, quite whole, and not wanting in the smallest details, but which are petrified into solid marble. When I last saw them I thought they were actually alive, until, on going closer, I noticed the eyes. They are in a sitting posture, and the veins, muscles, &c., may be distinctly traced through what is now a group of stone blocks; they are in a splendid state of preservation; even the finger-nails, teeth, &c., are as perfect as they were five hundred years ago. One of them has a stone axe by his side without any haft. The group altogether is the strangest concern I ever witnessed."

Consumption of Oxygen during Sleep.—M. Delbruck has lately raised the question, in a paper read before the French Academy, whether fresh air is necessary during sleep? The question has been taken up in the March number of the 'Cornhill Magazine,' but is not there so definitely disposed of as we think it might have been. Fresh air is essential to the oxydation of the blood; and as the circulation of this latter goes on during sleep, fresh air is essential to the sleeper. The amount of oxygen used is, however, very much less during sleep than in our waking hours. It is calculated to be only one-half of what it generally is during the latter, and only one-third of what it is during hard labour. Hence the same quantity of air would supply a sleeper much longer than a person awake. But it by no means follows that the air inspired during sleep should not be *pure*. When it is otherwise, there must, in order to obtain the requisite amount of oxygen, be an increase in the number or depth of respirations above the normal degree, thereby inducing a greater activity in the organs than is best adapted for repose; or otherwise the oxydating processes in the body will be imperfectly performed, and a tendency to disease set up. Again, as the heat of the body is chiefly maintained by the union of oxygen with the carbon of the food, we see how it is that additional covering is required during our sleeping hours, when the oxydizing process is comparatively feeble. Thus a person who falls asleep in his usual dress, and in an atmosphere of only average warmth, will mostly feel cold on awaking; while, on the other hand, if unable to sleep at night, his bed-covering will seem too warm. We come, then, to the conclusion that the air of our sleeping-rooms should be as pure as may be, consistently with a proper regard to temperature.

Ozone, a compensating agent for Carbonic Oxide, an Atmospheric Poison.—It has long been known that plants give out oxygen during daylight, while, in the dark, carbonic acid is evolved. Recent experiments have shown that not only carbonic acid but carbonic oxide, a far more noxious gas, is also given off, and it becomes a question how this atmospheric poison was neutralized. This question seems to have been answered by the still later discovery, that not only oxygen but ozone is given off by vegetation under the influence of light. There can be little doubt, therefore, that this is the agent which transmutes the highly poisonous carbonic oxide into the comparatively harmless carbonic acid. As ozone would not, however, be evolved in the dark, whilst the oxide would be so in undiminished or increased quantity, an additional reason is furnished by these discoveries for always removing plants from bedrooms at night.

Vibrio of Wheat.—Mr. Henry Deane, so well known as a microscopic observer, stated at one of the Microscopical Society's Meetings, that on a particular piece of land, whenever wheat is grown it is always infested with Vibrio, no matter what the length of time since the previous wheat crop or wheat crops have been grown in the mean time.

Notices of New Books.

'British Birds in their Haunts.' By the Rev. C. A. Johns, B.A., F.L.S. With illustrations on wood, drawn by Wolf, engraved by Whymper. London: Society for Promoting Christian Knowledge. Pp. 626.

I have much satisfaction in believing that my feeble efforts at describing our indigenous ferns have proved a source whence many a respectable family has derived meat, drink and clothing during the last twenty years. Yarrell's 'British Birds' has not been so largely availed of by our bookmakers, and I can only mention a single work that is solely indebted for its being to this respectable parentage. More will follow as a matter of course, and I cannot but feel that this work of Mr. Johns' is in great measure an offspring of the 'History of British Birds;' not such an offspring as proclaims its descent in every feature, but an offspring nevertheless. The most striking of all features in works of this kind is the arrangement: we have no natural arrangement, as I have lately said, and every author who lays claim to any intelligence on this subject believes he possesses a copyright in his system that must not be invaded. Surely to any one capable of reflection there is no great merit in Mr. Yarrell's arrangement; surely, also, the advent of a new work on British Birds afforded an excellent opportunity for effecting some change. What vast improvements have been made on the Continent! and yet Mr. Johns does not take the trouble of remodelling the system, but adopts it exactly as it stands in Mr. Yarrell's second edition, adding only those few species subsequently mentioned either in Mr. Yarrell's Supplement or in the 'Zoologist.' Again in the generic characters given collectively by Mr. Johns, but at the head of each genus by Mr. Yarrell, there is too close a correspondence; the words are not the same, but the purport is the same; and in many instances where Yarrell's were susceptible of considerable improvement that improvement is not to be discerned.

On the other hand I have to mention several excellent characteristics of the new work. The first is that the author places decidedly in the background those birds which have occurred but once or twice, and which have no claim whatever to the name of "British;" a few words are given to each, just enough to show that the author has in no instance overlooked the record, but that he scarcely thinks it worthy of preservation; a view of the case in which I most cordially concur, indeed I heartily wish that at least a tenth of the names which now uselessly encumber our list were struck out and entirely forgotten.

Another excellent feature of the new work is the unmistakeable evidence that the author is in very many instances familiar with the living bird: this I believe was rarely the case with Mr. Yarrell; everything that could be learned in the library or museum he had learned with the utmost assiduity and patience, had arranged with masterly skill, and had so combined and massed that his history, regarded as a history, left nothing to be desired. Mr. Johns' work is the very reverse of all; of the bibliography of Ornithology he seems to know absolutely nothing, except as contained in 'Yarrell' and the 'Zoologist;' but he makes up for this deficiency of book-knowledge by his evident acquaintance with our familiar birds in a state of Nature. His sketches have all the appearance of being from life, and are in a great many instances as vigorous as they are faithful. I select copious examples to illustrate this remark.

"*The Wagtail.*—The pied wagtail or dishwater is a familiar and favourite bird, best known by its habit of frequenting the banks of ponds and streams, where it runs, not hops, about, picking insects from the herbage, and frequently rising with a short jerking flight to capture some winged insect which its quick eye has detected hovering in the air. Its simple song consists of but few notes, but the tone is sweet and pleasing, and is frequently heard when the bird is cleaving its way through the air with its peculiar flight, in which it describes a series of arcs, as if it were every instant on the point of alighting, but had altered its mind. While hunting for its food it keeps its tail in perpetual motion. It shows little fear of man, and frequently approaches his dwelling. It may often be noticed running rapidly along the tiles or thatch of a country house, and it not unfrequently takes its station at the point of a gable or the ridge of the roof, and rehearses its song again and again. Very frequently, too, it perches in trees, especially such as are in the vicinity of ponds. Next to watery places it delights in newly-ploughed fields, and hunts for insects on the ground, utterly fearless of the ploughman and his implements. A newly-mown garden lawn is another favourite resort; so also is a meadow in which cows are feeding, and to these it is most serviceable, running in and out between their legs, and catching in a short time an incredible number of flies. The country scarcely furnishes a prettier sight than that afforded by a family of wagtails on the short grass of a park in July or August. A party of five or six imperfectly fledged birds may often be seen scattered over a small space of ground, running about with great activity and picking up insects, while the parent birds perform short aërial journeys above and around them, frequently alighting and transferring from their own mouths to those of their offspring, each in its turn, the insect they have just captured. They are at all times sociably disposed, being seen sometimes in small parties, and sometimes in large flocks. It has been noticed that when one of a party has been wounded by a discharge from a gun, another has flown down as if to aid it or sympathize with it. Advantage is taken of this habit by bird-catchers in France. It is the custom to tie wagtails by their feet to the clap-nets, and make them struggle violently and utter cries of pain when a flight of the same kind of birds is seen approaching; these stop their flight, and alighting are caught in large numbers for the spit, their flesh, it is said, being very delicate. They share too with swallows the praise of being among the first to announce to other birds the approach of a hawk, and join with them in mobbing and driving it away."—(P. 163).

"*The Skylark.*—Early in spring the flocks break up, when the birds pair, and for three or four months, every day and all day long, when the weather is fine (for the lark dislikes rain and high winds), its song may be heard throughout the breadth of the land. Rising as it were from a sudden impulse from its nest or lowly retreat it bursts forth while as yet a few feet from the ground into exuberant song, and with its head turned towards the breeze, now ascending perpendicularly, and now veering to the right or left, but not describing circles, it pours forth an unbroken chain of melody until it has reached an elevation computed to be, at the most, about a thousand feet. To an observer on earth it has dwindled to the size of a mere speck; as far as my experience goes it never rises so high as to defy the search of a keen eye. Having reached its highest elevation its ambition is satisfied without making any permanent stay, and it begins to descend, not with a uniform downward motion, but by a series of droppings with intervals of simple hovering, during which it seems to be resting on its wings. Finally, as it draws near the earth, it ceases its song and descends more rapidly, but before it touches the ground it recovers itself, sweeps away with almost horizontal flight for a short distance and disappears in the herbage. The time consumed in this evolution is at the most from fifteen to twenty minutes, more frequently less; nor have I ever observed it partially descend and soar upwards again. A writer in the 'Magazine of Natural History' maintains that those acquainted with the song of the skylark can tell, without looking at them, whether the birds be ascending or stationary in the air or on their descent, so different is the style of the song in each case."—(P. 179).

"*The Chaffinch.*—During the open weather of autumn and early winter chaffinches frequent stubble and ploughed fields, where they busily collect grain and the seeds of various weeds, and are not, I fear, very scrupulous whether they are engaged as gleaners of what is lost or robbers of what is sown. In severe weather they resort to farm-yards and homesteads, where, along with sparrows, buntings and greenfinches, they equally consider all they can find as provided for their own especial use. On the return of spring they feed upon the young shoots, and for a few weeks show themselves great enemies to horticulture. Their visits to our flower gardens, paid very early in the morning, are attested by scattered buds of polyanthuses, which they attack and pull to pieces as soon as they begin to push from between the leaves. In the kitchen garden they are yet more mischievous, showing a strong inclination for all pungent seeds. Woe to the unthrifty gardener who, while drilling in his mustard or cress or radishes, scatters a few seeds on the surface! The quick eye of some passing chaffinch will surely detect them; so surely will the stray grains serve as a clue to the treasure concealed beneath; and so surely will a hungry band of companions rush to the diggings and leave the luckless proprietor a poor tithe of his expected crop. Yet so large is the number of the seeds of weeds that the chaffinch consumes in the course of a year, more particularly of groundsel, chickweed and buttercups, that he, without doubt, more than compensates for all his misdeeds; and as his summer food partially, and that of his young family exclusively, consists of caterpillars and other noxious insects, he is in reality among the gardener's best friends, who should be scared away at the seasons when his visits are not welcome, and encouraged at all other times. The chaffinch, though a wary bird, does not stand greatly in fear of man, for if disturbed at a meal he is generally satisfied with the protection afforded by the branches of the nearest tree, on which he hops about until the danger is past, uttering his simple but not unpleasing note 'twink' or 'pink,' as it is variously translated. To this cry it adds the syllable 'sweet,' frequently repeated in an anxious tone, and with a peculiar restlessness of manner, which always indicates that its nest is somewhere very near at hand, and by which indeed it is very often betrayed."—(P. 197).

"*The Sparrow.*—Whatever is the staple food of an household, the sparrows that nestle around will be right pleased to share it,—bread, meat, potatoes, rice, pastry, raisins, nuts: if they have these for the asking they would not trouble themselves to search farther; but obliged as they are to provide for themselves, they must content themselves with humble fare; and so skilful are they as caterers that whatever other birds may chance to die of starvation, a sparrow is always round and plump, while not a few have paid for their voracity by their lives. Much difference of opinion exists as to whether sparrows should be courted by man as allies or exterminated as enemies. The fact that great efforts are at the present time being made to introduce them into New Zealand, where the corn crops suffer great injury from the attacks of insects, which the presence of sparrows would, it is believed, materially check, leads to the conclusion that their mission is one of utility. That sparrows consume a very large quantity of corn in summer there can be no doubt; as soon as the grain has attained its full size, and long before it is ripe, they make descents on the standing corn, and, if undisturbed, will clear so effectually of their contents the ears nearest to the hedges that this portion of the crop is sometimes scarcely worth the threshing. During harvest they transfer their attention to the sheaves, while the reapers and binders are occupied elsewhere. As gleaners they are indefatigable; they participate too in the joys of harvest home, for their food is then brought to their very doors. The most skilful binder leaves at least a few ears exposed at the wrong end of the sheaf, and these are searched for diligently in the rick; and the barns must be well closed indeed into which they cannot find admission. At threshings and winnowings they are constant attendants, feeding among the poultry, and snatching up the scattered grains under the formidable beak of chanticleer himself. At seed time their depredations are still more serious, as they now come in not simply for a share of the produce, but undermine the very foundations of the future crop. I once had the curiosity to examine the crop of a sparrow which had been shot as it flew up from a newly-sown field, and found no less than forty-two grains of wheat. A writer in the 'Zoologist,' who professes himself a deadly enemy of the sparrow, states that he once took one hundred and eighty grains of good wheat from the crops of five birds, giving an average of thirty-six for a meal. Now if sparrows had the opportunity of feeding on grain all the year round they would be unmitigated pests, and a war of extermination against them could not be waged too vigorously: but during the far greater portion of the year they have not the power of doing mischief, and all this time they have to find food for themselves. Against their will, perhaps, they now hunt for the seeds of various weeds, and these being smaller than grains of corn and less nutritive they consume an immense number of them, varying their repast with myriads of caterpillars, wireworms, and other noxious grubs. They thus compensate certainly in part, perhaps wholly, for the mischief they do at other seasons; and it is even questionable whether, if a balance were struck between them and the agriculturists, the obligation would not be on the side of the latter.—(P. 202).

An example of sound reasoning on the part of Mr. Johns occurs in his remarks on Mr. Yarrell's proposed alteration in spelling the name yellowhammer: I quote it as it stands.

"*The Yellowhammer.*—Yarrell has suggested that the name 'yellow hammer,' frequently applied to this bird, should be written 'yellow ammer,'—the word ammer being a well-known German term for bunting; but as it is doubtful whether it be possible to alter a mode of spelling which has been in common use for two hundred years at least, I have retained the name applied to the species by our earliest ornithologists, Ray and Willughby."—(P. 193).

Mr. Yarrell is rarely detected tripping in this way; and so great is the influence of his deservedly high reputation, that this trip is sure to be servilely copied by subsequent compilers. Nothing can be more annoying to the English student than to see French or German spellings introduced into Science.

"*The Siskin.*—The siskin or aberdevine is best known as a cage-bird, as it is only a winter visitor in Great Britain, and during the period of its stay is retiring in its habits. Siskins are more frequently met with in the northern than the southern counties of England, but are common in neither. They are generally observed to keep together in small flocks of from twelve to fifteen, and may be heard from a considerable distance, as they rarely intermit uttering their call-note, which, though little more than a soft twittering, is as clear as that of the bullfinch, to which it has been compared. Their flight is rapid and irregular, like that of the linnet. They leave their roosting places early in the morning, and usually alight on the branches of alder trees, where they remain all day. The seeds of the alder, inclosed within scales something like those of the coniferous trees, form the principal food of these pretty little birds, who are obliged to hang at the extremities of the twigs in order to explore the seed-vessels on all sides. Occasionally, but less frequently, they are seen visiting heads of thistles and burdocks, and not unfrequently they descend to the ground for the sake of picking up scattered seeds. During the whole of their feeding time they never cease twittering and fluttering about joyously from twig to twig. Now and then, as if by preconcerted signal given by a leader, they all take flight to another tree, or after a short evolution return to the same from which they started. Should it happen that while one little band is occupied in despoiling a tree another is heard in the air, the latter is immediately invited by general acclamation to take part in the banquet, and rarely fails to accept the invitation. Owing to this sociability of character they are easily entrapped, provided that one of their own species be employed as a decoy bird."—(P. 214).

"*The Nightjar.*—The bird itself is perfectly inoffensive, singular in form and habits, though rarely seen alive near enough for its peculiarities of form and colour to be observed. Its note, however, is familiar enough to persons who are in the habit of being out late at night in such parts of the country as it frequents. The silence of the evening or midnight walk in June is occasionally broken by a deep whirring noise which seemingly proceeds from the lower bough of a tree, a hedge or a paling. Having in it nothing of a chirp, warble or whistle, it is unlike the note of a bird, or indeed any natural sound, but most resembles the humming of a wheel in rapid revolution. Mr. Bell informs me that it is so like the croak of a natterjack toad that he has more than once doubted from which of the two sound proceeded. It is nearly monotonous, but not quite so, as it occasionally rises or falls about a quarter of a note, and appears to increase and diminish in loudness. Nor does it seem to proceed continuously from exactly the same spot, but to vary its position, as if the performer were either a ventriloquist or were actually shifting its ground. Fortunate observers have been able to creep up close enough to make out that the bird perches with its feet resting lengthwise on a branch, its claws not being adapted for grasping, and turns its head from side to side, thus throwing the sound as it were in various directions, and producing the same effect as if it proceeded from different places. I have repeatedly worked my way close up to the bird, but as I labour under the disadvantage of being short-sighted, and derive little assistance from glasses at night, I have always failed to observe it actually perched and singing. In the summer of 1859 a nightjar frequented the immediate neighbourhood of my own house, and I had many opportunities of listening to its note. One evening especially it perched on a railing within fifty yards of the house, and I made sure of seeing it, but when I had approached within a few yards of the spot from whence the sound proceeded the humming suddenly stopped, but was presently audible at the other end of the railing which ran across my meadow. I cautiously crept on, but with no better success than before. As I drew near the bird quitted its perch, flew round me, coming within a few feet of my person, and on my remaining still made itself heard from another part of the railing only a few yards behind me. Again and again I dodged it, but always with the same result. I saw it, indeed, several times, but always on the wing."—(P. 289).

"*The Green Woodpecker.*—Commonest among that of the natural sounds of the country is that of the

'Woodpecker tapping the hollow beech tree;'

so at least many people suppose; but, in reality, one may walk through the woods many times and hear no tapping at all, and even if such a sound be detected and traced to its origin it will more probably be found to proceed from the nuthatch, who has wedged a hazel nut into the bark of an oak, than from the hammering of a woodpecker. This bird is far too wise to waste its time and blunt its beak by pecking at wood hard enough to make much resonance. And indeed what motive could it have for so doing? Wood does not enter into its diet, nor does sound wood contain the insects on which it feeds. Often indeed it may be observed ascending by a series of starts the trunk of a tree, inclining now a little to the right, and now to the left, disappearing now and then on the side farthest from the spectator, and again coming into view somewhat higher up. Nor is its beak idle; this is employed sometimes in dislodging the insects which lurk in the rugged bark, and sometimes in tapping the trunk in order to find out whether the wood beneath is sound or otherwise. Just as a carpenter sounds a wall with his hammer in order to discover where the brickwork ends, and where lath and plaster begin, so the woodpecker sounds the wooden pillar to which it is clinging, in order to discover where the wood is impenetrable alike by insects and itself, and where the former have been beforehand with it in seeking food or shelter. Such a canker-spot found, it halts in its course, tears off piecemeal a portion of bark, and excavates the rotten wood beneath, either as far as the fault extends or as long as it can find food. It is, then, by no means a mischievous bird, but the reverse; as it not only destroys a number of noxious insects, but points out to the woodman, if he would only observe aright, which trees are beginning to decay, and consequently require his immediate attention. This aspect of the woodpecker's operations seems far more just than that contained even in modern books, 'it is a great enemy of old trees in consequence of the holes which it digs in their trunks.'"—(P. 292).

"*The Tree Creeper.*—The tree creeper, though a common bird, is less familiarly known than many others of much rarer occurrence, yet, if once observed, can be confounded with no other. In size it ranks with the tits, willow wren, &c., but is less likely to attract notice than any of these, as it never alights on the ground nor perches on the small twig of a tree. Its note, too, is weak, simple and unpretending, amounting to no more than an occasional 'cheep,' which it utters from time to time while hunting for food, and while performing its short flights. Any one, however, who wishes to see the bird, and knows what to search for, can scarcely fail of success if he looks well about him during a stroll through almost any wood of full-grown trees. Half way up the trunk of a rugged elm or oak he will observe a small portion of bark, as it were, in motion; the motion, and not the colour, betrays the presence of a small brown bird, which is working its way by succession of irregular starts up the trunk. Frequently it stops for a few seconds, as it is evidently pecking at some small insect, quite noiselessly however. Its beak is not adapted for hammering; it confines its attention therefore to such insects as live on the surface of the bark. It utters a low 'cheep,' and proceeds, not in a straight line up the tree, but winding in search of its prey; presently it disappears on the other side of the trunk, and again comes in view a few feet higher up. Now it reaches a horizontal branch; along this it proceeds in like manner, being indifferent whether it clings sideways or hangs with its back downwards. Arrived at the smaller divisions of the bough it ceases to hunt; but, without remaining an instant to rest, flies to the base of another bough, or more probably to another tree, alighting a few feet only from the ground, and at once beginning a new ascent. This mode of life it never varies: from morning to night, in winter and in summer, it is always climbing up the boles of trees, and, when it has reached the top, flying to the base of others. On one solitary occasion I observed one retrace its steps for a few inches, and stand for a second or two with its head downwards; but this is a most unusual position, as indeed may be inferred from the structure of its tail, the feathers of which are rigid, and more or less soiled by constant pressure against the bark."—(P. 302).

Of the illustrations I feel little inclined to speak; they are indeed original, but are they equally truthful? Where does Mr. Wolf get the enormous head of the short-eared owl?

EDWARD NEWMAN.

A Memoir on the living Asiatic Species of Rhinoceros.

By Edward Blyth, Esq., F.L.S., &c.

Among the investigations to which I devoted particular attention during my late rambles in Burmá, was the endeavour to corroborate and *confirm* the statement of Helfer and others, that the three known Asiatic species of rhinoceros inhabited that region. In this I succeeded, so far as the two insular species—*i.e.* the one-horned Rhinoceros sondaicus and the two-horned R. sumatranus—are concerned; for these prove to be the ordinary rhinoceroses of the Indo-Chinese region and continuous Malayan peninsula, and I have reason now to believe that they are the only rhinoceroses of that great range of territory, the huge R. indicus, so far as I can discover, appearing to be peculiar to the *tarai* region at the foot of the Himálayas and valley of the Bráhmaputra, or province of Asám; the rhinoceros still common in the eastern Sundarbáns, and also of the Rájmáhal hills in Bengal, where fast verging on extirpation, being identical with that of Jáva and Borneo, in the great oriental archipelago; while the Asiatic two-horned species, R. sumatranus, appears to be more common than the lesser one-horned, R. sondaicus, in the Indo-Chinese territories, this animal extending northwards to the Ya-ma-doung range of mountains which separates Arakan from Pegu, where Colonel Yule observed it as high as the latitude of Ramri island, and I have been assured by Major Ripley that one was killed not long ago in the vicinity of Sandoway. What the particular species may have been that was hunted by the Mogul Emperor Báber on the banks of the Indus cannot now be ascertained, unless, indeed, some bones of it may yet be recovered from the alluvium of that river: it is remarkable that he compares its bowels to those of a horse! A species is also stated by Duhalde to inhabit the province of Quang-si in China, in lat. 15°. This is much more likely to prove either R. sondaicus or R. sumatranus than the large R. indicus.

It is true that the late Dr. Theodore Cantor, in his 'Catalogue of the Mammalia of the Malayan Peninsula,' asserts that both R. indicus and R. sondaicus seem to be numerous there; but he does not mention that he had examined specimens, and he moreover notices that "a two-horned rhinoceros is stated by the Malays to inhabit, but rarely to leave, the densest jungle." As this animal is common in parts of Burmá, as well as in Sumátra, it may be confidently predicated to inhabit the intervening region of the Malayan peninsula;

but the more common and ordinary species of the peninsula would appear to be R. sondaicus; and a friend who has killed as many as nine individuals in the southern half of that region, to whom I showed several skulls of R. indicus and of R. sondaicus, is positive that all which he saw there were of the lesser one-horned species, as distinguished from the larger. The former, as before remarked, inhabits the islands of Jáva and Borneo in the archipelago, but not Sumátra;* whereas the two-horned species, as an insular animal, appears to be peculiar to Sumátra.† In the volume on elephants, &c., in Sir W. Jardine's 'Naturalist's Library,' the lesser one-horned rhinoceros is erroneously styled "the one-horned Sumátran rhinoceros," a mistake which might have been rectified by reference to Sir T. Stamford Raffles's paper in the thirteenth volume of the 'Transactions of the Linnean Society,' which indeed is cited by the compiler.‡

The vernacular tropical names of *Jávan* and *Sumátran* rhinoceroses had now better be disused, seeing that both species have an extensive range of distribution on the mainland of south-eastern Asia; the latter should rather be denominated "the Asiatic two-horned rhinoceros," and the two others "the great one-horned" and "the lesser one-horned," unless, indeed, the alleged discovery should be confirmed of the existence of a one-horned species in inter-tropical Africa, in addition to the four two-horned species which are now recognised upon that continent, in which case "the great Indian" and "the lesser Indian" might be deemed sufficiently appropriate, as the range of the "Asiatic two-horned" does not extend to India proper, which of course comprises Bengal but not Burmá. The existence of an African one-horned rhinoceros was long ago confirmed by James Bruce, of

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* The range of Bos sondaicus is similar, excepting that this animal does not extend to Bengal, like Rhinoceros sondaicus.

† As also the Malayan tapir, the continental range of which extends northwards to the Tenesserim provinces of Tavoy and Mergui.

‡ The adult male rhinoceros which lived for many years in the Gardens of the Zoological Society, Regent's Park, London, and for which the considerable sum of £1000 was paid, is stated to have been captured in Arakan; but he was not nearly so large as several that I have since seen in India, and therefore I entertain an exceedingly strong suspicion that he was no other than R. sondaicus. His bones have doubtless been preserved. The two Asiatic one-horned species, indeed, resemble each other a great deal more nearly, in external appearance, than the published figures of them would lead us to suppose. Certainly no sportsman or ordinary observer would distinguish them apart, unless his attention had been specially called to the subject. The best figure I know of adult R. indicus is that published by Cuvier and Geoffroy, in the 'Menagérie du Museum d'Histoire Naturelle.'

Kinnaird, in addition to the two-horned species which he pretended to figure;* and Sir Andrew Smith assured me that he had been repeatedly told by natives that such an animal occurred in the regions northward of the tropic of Capricorn. In the 'Comptes Rendus,' tome xxvi. (1848), p. 281, an elaborate letter is published, "Sur l'Existence d'une espèce Unicorne de Rhinocéros dans la partie tropicale de l'Afrique," from M. F. Fresnel, then consul of France at Jidda (Djedda), to which the reader, curious on the subject, is referred.

Professor Schinz, in his 'Synopsis Mammalium,' makes out as many as eight living species of rhinoceros. The two Asiatic one-horned species, of course; and R. sondaicus only from Jáva; R. sumatranus from Sumátra only, and of this he remarks, "Cornu anterius mediocre, posterius minutum." His R. niger and his R. Camperi must alike be referred to R. africanus. Next, R. simus and R. keitloa, but, of course, neither R. Oswellii nor R. Crossii. But what is his R. cucullatus, *Wagler*, unless an ill-stuffed R. sumatranus? "R. cornubus duobus, capite sensim elevato, plicis cutis profundis [!], clypeo scapulari indiviso, supra latiori, epidermide verrucis parvis obsita. Capite elongato, auriculis subcylindricis, labro elongato prehensili, cauda mediocri. Hospitatur in museo Monacensi."

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* Bruce's figure of the Abyssinian rhinoceros, it is well known, is a reversed copy of Buffon's representation of true R. indicus, with a second horn added; Dr. Rüppell ascertained the species to be R. africanus, the ordinary black rhinoceros of South Africa. The earliest published *genuine* figure of this animal is that in the Supplement to Buffon's work; but certainly the most spirited as well as correct pictorial representations, alike of the rhinoceroses and of various other animals of Africa, are given by modern sporting travellers, as Cornwallis Harris, and especially C. J. Andersson. By a slip of the pen, the latter writer alludes to rhinoceroses in the island of Ceylon! As even Humboldt referred to the tiger of Ceylon in his 'Asie Centrale'! There are capital figures of some of the arctic animals, also, in Mr. J. Lamont's 'Seasons with the Sea Horses' (1861), among the rest, of the Spitzbergen deer, represented with well-developed vertical brow-plates to their horns. The question about the development of these deer, as compared with those of Lapland, is elucidated by Mr. Lamont, who states that "They do not grow to such a large size as the tame rein-deer of Lapland, nor are their horns quite so fine, but they attain to a most extraordinary degree of condition." For futher details, see his extremely interesting volume. However, I may remark that in all his figures of rein-deer the brow-plate is represented as being well developed upon each horn, whereas I suspect that it is, generally, only rudimentary upon one of the pair; this, however, is probably a mistake on the part of the lithographer. In further reference to the article alluded to, in which I commented upon the late Professor Isidore St. Hilaire's remarks upon domestic animals, and contended that we do not owe the domestication of the turkey to the Spanish invaders of America, a most unlikely people to have accomplished anything of the kind, I may remark, that so completely familiar had this fowl become in Shakspeare's time that its then almost recent introduction into Europe had already been forgotten, for the great bard of Avon considerably ante-dates the existence of turkeys in England, making it prior to the Spanish discovery of the New World! In the first part of the drama of King Henry IV., Act ii. Scene 1, one of the carriers introduced exclaims, "'Ods-body! the turkeys in my panniers are quite starved." But it is not impossible that Shakspeare meant the guinea-fowl, albeit not very probable, though, in either case, he had antedated the appearance of the domestic bird in European countries.

From examination of an extensive series of skulls of Asiatic rhinoceroses it is impossible not to discern that there are three well-marked species, each of which varies considerably in the shape of the cranium. Of each there is a shorter and broader type, higher at the occiput, wider anterior to the orbits; and also a type the opposite of this, with every intermediate gradation. This amount of variation in the existing Asiatic species of the genus should induce caution in the acceptance of *all* of the very numerous fossil forms that have been named by palæontologists.

R. sondaicus and R. sumatranus are very inadequately represented by the figures of skulls published by Cuvier and De Blainville. Those of both authors represent the narrow type, as distinguished from the broad type; whereas their figures of the skull of R. indicus, the R. unicornis of Linneus, represent an unusually fine broad example of the species, doubtless the skull of the individual figured from life in the 'Menagérie du Museum d'Histoire Naturelle,' which gives a far greater amount of contrast of appearance to the skulls of R. indicus and R. sondaicus than exists in average specimens of those of the two species.

The skulls of R. indicus and R. sondaicus appear to differ only, *constantly*, in the former being considerably larger, and having the condyle of the lower jaw proportionally much more elevated, imparting a conspicuously greater altitude to the vertex when the lower jaw is *in situ*. Both species would appear to exhibit precisely the same amount of variation. On present evidence, which, however, I suspect to be fallacious, it would seem that the broader type of R. sondaicus prevails in Bengal, and perhaps the narrower far southward; but we have both from the Tenesserim provinces, and they completely shade into each other, as equally in the analogous instances of R. indicus and R. sumatranus.

In illustration of the skulls, I cite the figures of Cuvier and De Blainville as exemplifying the broad-faced type of R. indicus, and a very similar skull is that upon the skeleton of a *female* in the Museum of the Calcutta Medical College. This female is one of a pair that lived about forty-five years in captivity in Barrackpore Park. I have repeatedly seen the pair when alive, many years ago, and remarked that they showed no *secondary* sexual diversity, being exactly of the same size and general appearance. They never bred; and I have been informed that a pair of tapirs similarly kept for many years, in Batavia, showed no disposition to propagate their species. They should, of course, have been separated for a time now and then, and again put together. We learn from this Calcutta Medical College specimen and others, that the two forms of skull presented by the Asiatic species of rhinoceros are not indicative of sex, as might probably have been suspected.

So far as I can learn, the R. sumatranus is the only existing species of rhinoceros which presents secondary sexual distinctions; inasmuch as the horns of the male are very considerably more developed than those of the female. It further differs from the four existing African species of two-horned rhinoceros, not only by possessing slight skin-folds, but also by having the bases of the horns separated by a considerable interval: Bell's figure, in the 'Philosophical Transactions' for 1793, represents, as I believe, their full development in an adult female, as shown likewise in a Tenesserim stuffed head in the Society's Museum, already referred to; and over Bell's figure of the skull of a male are represented in outline the horns of an ordinary male, not quite so fine, however, as those upon Col. Fytche's specimen, and that officer informs me that he has possessed a head with still finer horns, some five or six inches longer. Unfortunately, fine horns of R. sumatranus are exceedingly difficult to procure, as they are eagerly bought up at high prices by the China men, who not only value them as medicines, but carve them into very elegant ornaments.* Still the horns which Dr. Salomon Müller figures, upon what he calls an adult male, are small; and when I was at Pahpoon, amid the forests of the Yunzalin district of Upper Martaban, in November last, an animal of this species was killed within five miles of me; but I did not learn of this in time, and was only able to procure the facial bones with the two horns. From their size and appearance I took them to be the horns of rather a juvenile male, but, on cleaning the bone, the nasals were found to be most completely and solidly anchylosed and united, and of the usual width in the male sex. The Karens obtained the animal by means of a heavy falling-stake, such as they set for tigers and other large game, and the carcase was completely hacked to pieces by them, and every edible portion of it devoured.

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* The anterior horn of Colonel Fytche's specimen is worth, I was told, about fifty rupees, or £5. I have seen a pair beautifully carved and polished, and set with the bases upwards, in a black wooden frame similar to the stands on which Chinese metallic mirrors are mounted, and am sure *now* that they were the two horns of one individual of R. sumatranus, of about the same development as those upon Colonel Fytche's specimen.

The Rev. Dr. Mason, in his work on 'The Natural Productions of Burmah,' remarks that the hide of the two-horned rhinoceros of that region is smooth like a buffalo's. This expression might mislead into the suspicion that the species is not exactly the same as that of Sumátra. Col. Fytche writes word, on this subject, "I have myself shot three rhinoceroses; one single-horned, on the borders of Asám,* and the other two not far from Bassein, in the Yomatoung range separating Pegu from Arakan. I saw the skin of the one whose skull you have got,† and it was exactly, in every respect, like the one I shot in Asám. The two-horned fellows I shot had smooth skins, as stated by Mason; they were, however, very thick, and there were slight rumples or folds about the neck and shoulders, I remember, but nothing to be compared in size to the mailed armour of the single-horned species." In Burmá, people distinguish only a one-horned kind and a two-horned kind; and though the skull from Tavoy Point referred to is very nearly adult and of fair size, Col. Fytche thought it to be that of a small and immature animal, as compared with the huge R. indicus that he killed in Asám. I must frankly confess that I have only quite recently discriminated the two one-horned species, fancying, as a matter of course, that the numerous skulls of single-horned rhinoceroses in the Society's Museum, from the Bengal Sundarbáns, &c., especially of the broad-faced type, were necessarily of the hitherto-reputed sole Indian species. F. Cuvier's figure of R. sondaicus is that of a very young animal, and, with those of Horsfield and S. Müller, conveys the appearance of a more evenly *tessellated* hide than I remember to have seen in any living continental example. I have, however, been comparing our stuffed Sundarbán example (less than half-grown) with the figure of adult R. indicus in the 'Menagérie du Museum d'Histoire Naturelle,' and with the figures of R. sondaicus by S. Müller and others, and perceive that it must be referred to the latter and not to the former. The tubercles of the hide *are* much smaller than in R. indicus; and a marked difference between the two species, as represented, consists in the great skin-fold *at the setting on of the head* of R. indicus, which is at most but indicated in R. sondaicus. In skulls of adults, however those of both species may vary in width, and especially in breadth anterior to the orbits, the following distinctions are trenchant:—Length of skull, from middle of occiput to tip of united nasals, measured by callipers, in R. indicus 2 ft. (half an inch more or less); in R. sondaicus, $1\frac{3}{4}$ ft. at most. Height of condyle of lower jaw, in R. indicus 1 ft., or even a trifle more; in R. sondaicus 9 in. Breadth of bony interspace between the tusks of the lower jaw, in R. indicus $1\frac{1}{2}$ in. to $1\frac{3}{4}$ in.; in R. sondaicus $\frac{3}{4}$ in. to 1 in. These measurements are taken from exceedingly fine examples of both species.

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* R. indicus, of course.

† That of R. sondaicus, of the narrow type, shot by my friend Dr. Hook, of Tavoy, near Tavoy Point, where there is a small isolated colony of the species.

Sir T. Stamford Raffles asserts, of R. sumatranus, that "the female has a larger and heavier head than the male, but is similar in other respects." (!) This decidedly does not apply to the two-horned species inhabiting Burmá, nor even to Bell's figures of *Sumatran* individuals! Raffles further remarks that, "Dr. Bell's description and representation of this animal are extremely correct. The skin of the Sumatran rhinoceros," he adds, "is much softer and more flexible than that of the Indian one, and is not, like it, corrugated into plates of mail. It has, however, some doublings or folds, particularly about the neck, shoulders and haunches, rather more distinct and defined than in Dr. Bell's drawing. The natives assert that a third horn is sometimes met with, and in one of the young specimens procured an indication of the kind was observed." In Mr. C. J. Andersson's 'Lake Ngami' the same is remarked of one or more of the ordinarily two-horned rhinoceroses of Africa. This traveller writes, "I have met with two persons who told me that they had killed rhinoceroses with three horns; but in all such cases, and they have been but few, the third or hindmost horn is so small as to be scarcely perceptible." This seems a not unlikely character to have been developed more frequently in the great fossil R. tichorhinus of North Europe and Asia.

Bell further mentions, of R. sumatranus, that "The whole skin of the animal is rough, and covered very thinly with short black hair." The latter is conspicuously represented in F. Cuvier's portrait of the species in the 'Planches des Mammifères,' less so in Bell's figure in the 'Philosophical Transactions,' and in that by Dr. Salomon Müller, and it is well shown about the *jowl* and base of the lower jaw of our stuffed skin of the head of an adult female. In Dr. S. Müller's figure of what he styles an adult male, but the horns of which are quite small, as in the adult Martaban example before noticed,* the shoulder-plait is rather more strongly developed, especially towards the elbow, than in the figures published by Bell and F. Cuvier,— F. Cuvier's figure representing a young male, and that by Bell a mature female, while the skull represented by Bell is that of a male with finer horns than appear to have been hitherto represented elsewhere.

Sir T. Stamford Raffles further remarks of the Asiatic two-horned rhinoceros, in Sumátra, that "They are not bold, and one of the largest size has been seen to run away from a single wild dog." We hear, however, of a "fire-eating rhinoceros" in Burmá, from its habit of attacking the night-fires of travellers, and scattering the burning embers and doing other mischief, being attracted by unusual noises, instead of fleeing from them as most wild animals do. Professor Oldham's camp was attacked in this way, in Tavoy province, and the animal being mortally wounded by a two-ounce ball, its skull was recovered three days afterwards, and proved to be that of R. sumatranus. The same propensity is ascribed to the ordinary black rhinoceros of South Africa (R. africanus): thus Dr. Mason cites, "This animal appears to be excited by the glow of a fire, towards which it rushes with fury, overcoming every obstacle. It has been known to rush with such rapidity upon a military party lodged among the bush covering the banks of the Great Fish River, that, before the men could be aroused, it had severely injured two of them, tossed about and broken several guns, and completely scattered the burning wood." I am not aware that the same ferocity has been remarked of either of the mailed one-horned species.

In Jáva R. sondaicus is reputed to be rather a mild animal, though I could cite a rumour of one attacking a sailor's watering party (Zool. 7328). According to Professor Reinhardt, this animal is, in Jáva, "found everywhere in the most elevated regions, and ascending, with an astonishing swiftness, even to the highest tops of the mountains." Dr. Horsfield also notices that "it prefers high situations, but is not limited to a particular region or climate, its range extending from the level of the ocean to the summits of mountains of considerable elevation. Its retreats are discovered by deeply-excavated passages, which it forms along the declivities of mountains and hills. I found these occasionally of great depth and extent." In Bengal, I believe that the identical species is found in the Sundarbáns and also (formerly, at least) in the Rajmáhal Hills at all elevations; but it has hitherto been universally mistaken for R. indicus, a species which may inhabit the same localities,—only that now remains to be ascertained, as also if R. sondaicus extends its range to the region tenanted by the other. All evidence at present attainable points to the opposite conclusion.

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* Can these animals, under any circumstances, occasionally shed and renew their horns, which consist only of a mass of agglutinated hair? There is certainly no physiological objection to the possibility of their doing so.—*E. B.*

So long ago as in 1838 the late Dr. Helfer remarked, that "The Tenesserim provinces seem to be a convenient place for this genus; for I dare to pronounce almost positively," he then wrote, "that the three known Asiatic species occur within their range; R. indicus being found in the northern part of these provinces, in that high range bordering on Zimmay called the Elephant Tail Mountain; R. sondaicus, on the contrary, occupies the southernmost parts; while the two-horned R. sumatranus is to be found throughout the extent of the territories from the 17th to the 10th degree of latitude. In character R. sondaicus seems to be the mildest and can be easily domesticated, the powerful Indian rhinoceros is the shyest, and the double-horned is the wildest." Mason remarked that "the common single-horned rhinoceros is very abundant. The double-horned is not uncommon in the southern provinces;" and then he alludes to the alleged "fire-eater" of the Burmans, supposing that to be R. sondaicus as distinguished from the common single-horned kind, which he thought was R. indicus. Very decidedly I consider that the alleged existence of the great sub-Himalayan R. indicus in Bengal, the Indo-Chinese region, and Malayan peninsula, remains to be proved; the broad and narrow types of skull of R. sondaicus having, I suspect, been mistaken for R. indicus and R. sondaicus respectively. That the real species denoted by these names was so early discriminated, I opine, is mainly due to the accident of R. sondaicus having been first obtained in Jáva, which induced the suspicion of its being probably different from the only then recognised continental species inhabiting Upper India; likewise to the accident of the Paris Museum containing a particularly fine skull of the true R. indicus, which, as before remarked, is probably that of the individual figured in the 'Menagérie du Museum d'Histoire Naturelle.'

The Museum of the Calcutta Medical College contains, as we have seen, three noble skulls of R. indicus, besides that with the entire skeleton of an old female, both the broad and narrow types of skull being represented, but it has neither R. sondaicus nor R. sumatranus. The Society's Museum still wants the first species, but is tolerably well supplied with the two others. Sir T. H. Maddock, in 1842, presented us with two skulls of R. sondaicus, of the broad and the narrow types, and also with two of R. sumatranus, one wanting the lower jaw, all from the Tenesserim provinces; and the skulls of an old male and of an adult female of R. sumatranus,—the skin of the head of the latter, its axis vertebra, the long bones of the limbs (*minus* the right fore limb and scapula), and the two scapulæ and long bones of the four limbs of the male,—were presented to the Society by Mr. E. O'Reilly, then of Amherst, in 1847. In the 'Asiatic Researches' part of the head of a two-horned rhinoceros is recorded to have been presented, and also the horn of a rhinoceros from Sumátra. The latter was not in the Museum when I took charge of it in 1841, but the former I think I recognise in a pair of united nasal bones, certainly belonging to this species, and in this case the specimen would probably be from a Sumatran individual. Of R. sondaicus we have also a fine series of skulls, one of them from Jáva, presented by the Batavian Society; the almost complete skeleton of a very nearly full-grown female, being considerably smaller than that of the female R. indicus in the Medical College Museum, and the small stuffed specimen to which I have before referred, the limb-bones of the skeleton being considerably more robust than those of R. sumatranus. For this skeleton, and those of elephant and camel, we are indebted to a former Náwâb Názim of Bengal, and it is doubtless either from Rajmáhal or the Sundarbáns, the skull being of the broad type, though less strongly marked than some others,—in fact intermediate, though scarcely quite midway intermediate.

The following notice, by Sir T. Stamford Raffles, may be advantageously introduced here:—"The one-horned rhinoceros of India is not known to the natives of this part of Sumátra; and the single horns, which are occasionally procured, appear to be merely the longer horns of the two-horned species separated from the smaller one. There is, however, another animal in the forests of Sumátra never yet noticed, which, in size and character, nearly resembles the rhinoceros, and which is said to bear a single horn. This animal is distinguished by having a narrow whitish belt encircling the body, and is known to the natives of the interior by the name of Tennu. It has been seen at several places, and the descriptions given of it by people, quite unconnected with each other, coincide so nearly, that no doubt can be entertained of the existence of such an animal. It is said to resemble in some particulars the buffalo, and in others the badak or rhinoceros. A specimen has not yet been procured, but I have several persons on the look out, and have little doubt of soon being able to forward a more accurate description from actual examination.

"It should be remarked," continues Raffles, "that the native name, Tenu, has until lately been understood to belong to the tapir. It is so applied at Malacca, and by some of the people of Bencoolen. In the interior, however, where the animals are best known, the white-banded rhinoceros is called 'Tenu,' and the tapir 'Gindol,' and by some 'Babi Alu.' It is not impossible that, as both animals have white bands, the names may have been confounded by people little in the habit of seeing either, and deriving their information solely from report. In a country like Sumátra, where the inhabitants, in a great measure shut out from general communication, are divided into an infinity of tribes, speaking different dialects, a perfect consistency or uniformity of nomenclature cannot be expected, and it is not always easy to reconcile the synonymy."

It naturally occurs to the mind that if the tenu really exists it would long ere this have been discovered, in all probability, in the neighbouring Malayan peninsula; but how little is even now known of the great animals inhabiting that peninsula! The late Dr. Cantor, when he wrote his 'Catalogue of the Vertebrated Animals of the Malayan Peninsula,' was unaware of the existence there of Bos sondaicus in addition to B. gaurus, only includes a two-horned rhinoceros on the testimony of the Malays; and whether Elephas sumatranus occurs on the mainland of Asia, like the tapir and the two insular species of rhinoceros, the Bos sondaicus and others, is still undetermined. It is possible enough, though doubtless rather improbable, that such an animal as the tenu may have escaped observation there even to this time. But it might not extend its range into the peninsula (as in the instance of the large Siamang gibbon, which is peculiar to Sumátra); and not very much has been accomplished in the investigation of the Zoology of the great island of Sumátra since the time of Raffles. At all events, I think the present opportunity a meet one to recall the subject to notice.

Baron Cuvier long ago remarked, I think in his 'Leçons dans l'Anatomie Comparée,' that even then it was not probable that any more existing large quadrupeds remained to be discovered; and it is worthy of notice that no remarkable genus of large quadruped has been since brought to light, though additional species have been discriminated of several of the old genera. The small Hippopotamus liberiensis of the late Dr. Morton is scarcely an exception, although since raised to generic rank by Dr. Leidy, by the name of Chœropsis.

Of the three genera containing the most bulky of existing land quadrupeds additional species have been distinguished, though, for the most part, they may not yet be universally accepted. Of Elephas, the E. sumatranus of Temminck and Schlegel, to which Sir J. Emerson Tennent refers the Ceylon elephant;* of Rhinoceros, a second black African species, the R. keitloa of A. Smith, long previously indicated by Sir J. Barrow by the name "Jekloa," and a second white African rhinoceros, the R. Oswellii of Elliot, besides the R. Crossii of Gray (founded on the horn only, and the habitat of which is unknown); and of Hippopotamus, the species of North and South Africa respectively are distinguished by Dr. Leidy and others (sinking H. senegalensis of authors, as a synonym of the former), and there is also the Hippopotamus or Chœropsis liberiensis, which is a most undoubted species, considered, as we have seen, entitled to generic rank by Dr. Leidy. Whether external differences exist between the great Hippopotami of North and South Africa remains to be shown; as also in the case of the European and American beavers, which Owen separated on account of differences in the configuration of the skull: in another animal first so discriminated, the Phascolomys latifrons of Owen, good external distinctions have since been discovered, which characterize it well apart from P. wombat. Of other Pachydermata of

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* The grinders of Elephas sumatranus are said to be intermediate in form to those of the Indian and African species; and I have just purchased a pair of table-weights, formed each of a thick horizontal section of an elephant's molar tooth, which seems to me to be of this species. The little boxes formed of sections of elephant's molars, which are commonly brought from Galle, are, so far as I have seen, of the Indian species; but these are not necessarily from Cinghalese individuals. It is worthy of remark, however, that whilst among the elephants of Sumátra and Borneo fine *tuskers* would appear to be common, and the ivory is an article of export from both islands, as I am assured by a gentleman who has collected the article in Borneo, they are exceedingly rare among the elephants of Ceylon, where, nevertheless, it has been suggested that tuskers are so much sought after that they are seldom permitted to develope their ivories. With reference to Sir J. E. Tennent's speculation regarding the former continuity of land between Sumátra and Ceylon and Africa, of which the intermediate character of Elephas sumatranus is one of his presumptive proofs, it may be remarked that the *two-horned* Rhinoceros sumatranus, with its only slight skin-folds, interposes a link between the two-horned and smooth-skinned African and the single-horned and mail-clad Asian species; but, not to allude further to the alleged existence of a single-horned African species, the presence of the second horn in R. sumatranus is much less remarkable when we bear in mind the several fossil two-horned species of Europe and Asia, to which, moreover, the existing two-horned Asiatic rhinoceros is much more nearly akin than it is to the different African two-horned species, as before remarked.

Cuvier, more Equi, of the asinine type, have been added to the list, and several species of swine. Among the bovine ruminants the three species of flat-horned taurine cattle proper to south-eastern Asia have only recently been properly distinguished; also the Bubalus brachyceros of intertropical Africa; and there are others, as I believe, not yet sufficiently established, and more species also of large deer and antelopes. Among the Carnivora, no animal worthy of much note, unless Phocidæ (as might have been expected), and the like with Cetacea, my Balænoptera indica, for example, which is perhaps the largest of existing animals, but these latter are not four-limbed. Among the Quadrumana, the grandest of all, the huge gorilla, has been recently re-discovered, for its reputed existence was regarded as fabulous by Baron Cuvier. Lastly, in the bird class, it is most remarkable that the number of brevipennate species has quite recently been more than quadrupled;* still, however, no remarkable new genus, excepting the New Zealand moa, and of this at least two species have just been discovered to maintain a lingering existence, as I have learned from a letter recently received from Mr. E. L. Layard, who is at present in New Zealand as private secretary to Governor Sir G. Grey. One of these, of comparatively small size (about 3½ feet high), has actually been killed and eaten by a famishing party of explorers, and fifteen others seen. Of the other, one of the large moas, only the fresh footsteps, fifteen inches long, have been traced, as Mr. Layard states, by a party who had lost themselves; and therefore the instance does not appear to be the same as that lately recorded in the 'Zoologist' (Zool. 7847). Both of these living species inhabit the little-explored Middle Island.

EDWARD BLYTH.

Calcutta, March 1, 1862.

A further Note on Elephants and Rhinoceroses.—There is a notice of the wild elephants of Borneo in Mr. Spencer St. John's 'Life in the Forests of the far East' (1862), vol. i. p. 95. This author writes, "Among our Malays was one who had frequently traded with the north-east coast of Borneo, and the mention of 'gading' (ivory) brought to his recollection that elephants exist in the districts about the river Kina Batangan. I have seen many tusks brought to Labuan for sale, but never measured one longer than six feet two inches, including the part set in the head. I have met dozens of men who have seen the elephant there, but my own experience has been limited to finding their traces near the sea-beach. It is generally believed that about a hundred years ago the East India Company sent to the Sultan of Sulu a present of these animals; that the Sultan said these great creatures would certainly eat up the whole produce of his little island, and asked the donors to land them at Cape Unsang, on the north-east coast of Borneo, where his people would take care of them. But it is contrary to their nature to take care of any animal that requires much trouble, so the elephants sought their own food in the woods, and soon became wild. Hundreds now wander about, and constantly break into the plantations, doing much damage; but the natives sally out with huge flaming torches, and drive the startled beasts back to the woods. The ivory of Bornean commerce is generally produced from the dead bodies found in the forests, but there is now living one man who derives a profitable trade in fresh ivory. He sallies out on dark nights, with simply a waist-cloth and a short sharp spear: he crawls up to a herd of elephants, and, selecting a large one, drives his spear into the animal's belly. In a moment the whole herd is on the move, frightened by the bellowing of their wounded companion, who rushes to and fro, until the panic spreads, and they tear headlong through the jungle, crushing before them all the smaller vegetation. The hunter's peril at this moment is great, but fortune has favoured him yet, as he has escaped being trampled to death. In the morning he follows the traces of the herd, and, carefully examining the soil, detects the spots of blood that have fallen from the wounded elephant. He often finds him, so weakened by loss of blood as to be unable to keep up with the rest of the herd, and a new wound is soon inflicted. Patiently pursuing this practice, the hunter has secured many of these princes of the forest." In another place (vol. i. p. 396), but again with reference to the valley of the Kina Batangan river, Mr. St. John remarks, "As this is the only country in Borneo where the elephants are numerous, it is the only one where ivory forms an important article of trade in the eyes of the natives." Now, I am well aware of Mr. Darwin's calculation as to what the accumulated progeny of one pair of slow-breeding elephants might amount to in the course of five centuries, supposing that nought happened to check their increase in the geometrical ratio; but I doubt exceedingly that, in the instance under consideration, the existing great herds of elephants in the north-eastern peninsula of Borneo have descended from some two or three individuals put ashore by the order of the Sultan of Sulu, a little more than a century ago, continually decimated, too, as these elephants would seem to have been and are at this time; and I doubt it all the more because it appears that herds of wild elephants existed until recently in Sulu! Why, therefore, should the few tame elephants presented to the Sultan of Sulu be landed in Borneo? The remnant of the wild race existed in Sulu within the memory of people now living. On this subject, Mr. St. John fortunately helps us with information. In his notice of Sulu, he remarks, "Remembering Forest's statement that elephants were found in his time in the forests which clothed so much of the soil of the island, I asked Dater Daniel about it; his answer was, that even within the remembrance of the oldest men then alive, there were still a few elephants left in the woods, but that, finding they committed so much damage to the plantations, the villagers had combined and hunted the beasts till they were all killed: I was pleased to find the old traveller's account confirmed."—Vol. ii. p. 243. Why should the elephant of Borneo have been introduced by human agency any more than the Rhinoceros sondaicus or the Bos sondaicus, which latter would appear to be remarkably numerous on the vast island?—*E. B.*

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* Even a *sixth* cassowary has since been added by the Baron von Rosenberg, of Amboyna. It is from the island of Salawatti, and has *no wattles*, as in all the others. He terms it Casuarius Kaupi. The Balæniceps Rex must be considered as a remarkable discovery among large birds; and this is quite a new genus.

Enormous and deformed Horns of Red Deer and Roe.—I have been trying to find out the history of the big head, and have at last succeeded. It appears that it was the head of a stag shot several hundred years ago in Wallachia, whence it was sent down the Danube to Constantinople, and thence found its way to Sheffield for cutlery purposes; but a Viennese, seeing it in a cutler's store, bought it and brought it back to Vienna for his collection. He died, and it was then sold, with the rest of his collection, to a Mr. Exinger, a large game-dealer here, who also deals in deers' horns, skins, &c. It was then exposed for sale in the game market, where Julian Fane bought it for me. This story is told me by Mr. Vynes, a Queen's messenger, whom I met at dinner at the Embassy here, and he says he has known the head for years here in Vienna; it was celebrated as a wonder in Hungary and Wallachia, and was said to be one of the largest specimens of red-deer horns in the world. He says it has been examined here and found to be real, though much broken and repaired; the skull, however, was adapted to the horns, which were fastened on to it. I can now tell you what I have hitherto been a little in the dark about myself, that since I have been in Germany I have seen heads in old collections (not for sale) not only as large and with as many points, but larger and with more points. The most remarkable collection in Germany, I believe, is that of the King of Saxony, at the Castle of Moritzburg, about five miles from Dresden; there are there 120 red deers' heads, seventy gigantic ones in one room, and the rest, being deformed and singular specimens, are in another room by themselves. The heads in the large room vary from twenty-four points to fifty, of which latter number there are two, but they are by no means the largest heads,—in fact, they are nearly the smallest, though themselves gigantic,—and the points are crowded on these two heads like thorns on a bush, and not much larger. But there are heads in that room which take one's breath away. The largest head has only twenty-four points, but is 7 feet wide in the spread, and the points are all 18 inches and upwards! There are many heads with thirty, thirty-two, thirty-six, forty-two and forty-five points, all gigantic; and I assure you that that big specimen of mine would look like nothing by them. As the measurement stands, it is 5 feet 5 inches from outside to outside. The big head at Moritzburg is 7 feet inside, and each horn over 4 feet long. There is nothing like them that I ever saw, and I believe nothing in the world like them; but when I tell you that an Irish elk's head, which is in the next room to them (it is a fair specimen, but I have seen much larger), looks quite small by them, you may imagine what they are. Not only the number of points is wonderful, but the strength and thickness of horn. Many of the points are over 2 feet long, and I am sure, if some of the heads were put on the ground, they would stand 6 feet high, or more. I have set an artist to work to sketch me the whole collection, each head on a separate page; it will make a curious and valuable book. I bought a head at Berlin, which would look small by these, but still measures 4 feet 7 inches wide between the horns, has nineteen long points, and the horn is so thick that I cannot grasp it with two hands. Another, with sixteen points, 3 feet 7 inches wide, is also a splendid head. I have picked up some wonderful roe-deer heads at Prague and Berlin, four or five of them having horns each 18 inches long, with ten points, five on each horn, besides many deformed ones. I will show you all these curiosities when I return. I hope to pick up more in Austria. I bought a fine deformed head here to-day, with thirteen points, very curiously formed and very large; and I am about another, which is most wonderful: it is a deformity, but I have so many large heads now that I value deformities more than monsters, unless the latter are something quite above the common. I bought, at Prague, a roe head, which I do not think the man knew the value of: I never saw one quite like it; it is all grown together in a mass like a honeycomb: the animal was found dead, so probably it was the result of some disease. There are some other curious ones, and one or two much larger than any roe heads of Scotland: I believe they are mostly of great age, killed two or three hundred years ago. I saw a collection belonging to the Prince Augustus, of Wurtemburg, at Berlin, and there were some marvellous heads, both of red deer and roe, in it. He had two roe heads grown in a mass, and I believe he paid nearly £150 for one of them! I saw one at Ratisbon of the same kind, belonging to a brewer, who asked £100 for it, but then he had shot the beast himself. I mean to go down to Pesth and Belgrade, in Hungary, and I hope to find something wonderful there, as that is the country for these things: they are all bought up from there by the dealers in these towns, and therefore, if there is anything curious, it is as well to get them first hand. There are deer here, in the Prater, or Park of Vienna, which I have often seen, with eighteen, twenty, twenty-two and twenty-four points.—*Lord Powerscourt, in a letter to F. T. Buckland, published in the 'Field' of April* 11, 1863.

[The particular pair of horns to which Lord Powerscourt refers, in the beginning of this communication, was exhibited for some weeks in the window of the 'Field' office, and was a very attractive object.—*Edward Newman.*]

A Visit to Mew Island.—In June, 1858, I spent a day in exploring Mew Island, a little coral islet near the entrance of the Sunda Strait. It is densely wooded to the water's edge, and is partly encircled by a barrier reef. As I step from the boat upon the reef I am struck at once with the extreme beauty of a species of Amphitrite which lives in holes of the great solid madrepores which compose the reef. The gills of these lovely Annelids are in the form of spiral laminæ, of a brilliant orange-green and blue. These resplendent gaudy plumes are alternately extruded and withdrawn, and, seen through the pellucid water, present a very singular and beautiful appearance. On the moist sand within the reef are numbers of pale gray crickets, veritable maritime Orthoptera, which share the strand with horsemen crabs, and perforate the soil in every direction. It was calm as well as hot, and the still water under the dark shadow of the overhanging trees abounds with long-spined purple sea eggs, and glancing here and there among them are black and yellow Chætodons, strikingly handsome fishes on account of the contrast of colour. Jumping from stone to stone, like so many tiny seals, are numbers of Periophthalmi, fish as singular in form as the Chætodons are vivid in colour. Sea slugs or Holothuriæ are lying quiescent in the shallow pools or "dragging their slow lengths along" the coral *débris*. Some crabs with bright scarlet eyes, hiding beneath the madrepores, and Ophiuri, with slender snake-like rays, wriggling their way among the dead shells and seaweed, also struck me as very curious during my sojourn on this tropical barrier reef. On penetrating the jungle I admire the great gutta percha trees firmly anchored in the loose coral, and supported by broad buttresses, which extend beyond the base of the trunks. One giant tree has fallen, and his prostrate form is already clothed with a drooping pall of Epiphytes, and nearly screened from view by the pinnate fronds of Lomariæ, and the cylindric branches of enormous Lycopodiums. A species of solitary wasp and legions of indefatigable ants are engaged on the work of demolition, which in the Tropics is soon effected, while in the tree-tops overhead the Cicadæ are chanting a monotonous dirge over the decaying form of the vegetable giant. This is the first time I have seen the Cycas in fruit, and I obtain some fine specimens of the size and shape of large pine apples. A species of Nepenthes, with very pretty pitchers, is growing also in great luxuriance in one part of the island. And now I come upon a deserted village which offers a picture of mingled plenty and desolation. The ruined huts are encircled by verdurous broad-leaved bananas and the blackened stems of burnt palms, while some are overgrown with ferns or half buried beneath dense masses of parasitic creepers. The capsicum and cotton plants around are choked by the rank growth of trailing Convolvuli, and the village paths are green with weeds, and obstructed by rotting trees swarming with centipedes and scorpions. Absorbed in the contemplation of this strange scene, I am startled by the sound of heavy flapping wings, and looking up see two large birds with outstretched necks winging their way to a tall bare tree adjacent. They perch side by side, and I recognise the great black and white hornbill. In the perfect solitude of the jungle sudden sounds of mystery, like the vibration of these birds' wings, recal visions of tigers and other jungle horrors, and the hand instinctively moves towards the faithful revolver. The Malays had come over here to avoid the tigers which had devastated their village on the mainland, but these man-slayers, having tasted human blood, swam over to the island, and so molested them that they were forced to quit the neighbourhood altogether.—*Arthur Adams.*

Ornithological Notes between Bristol and Dublin.—On the 20th of March, while off the Bishop and Clerks, near Milford, a flock of shearwaters accompanied us for about six miles. Their flight is most beautiful, and resembles that of the martin more than any bird I know. There was a gale blowing from the westward, and though the bird is nearly the size of the razorbill, they flew against it at an astonishing rate, occasionally cleaving the water with their breasts. While in the Liffey, an Iceland gull was feeding with a flock of herring gulls. On the 8th of April, when returning, I saw a flock of six shearwaters off the Wexford Coast. During a squall accompanied with sleet, and in about mid channel, a meadow pipit accompanied us for some time, endeavouring to settle on the rigging. At last it flew as if in despair before the squall north-east.—*H. Blake-Knox ; 49, Pulteney Street, Bath, April* 10, 1863.

Marsh Harrier, Peregrine Falcon, Iceland Falcon, &c., in Ireland.—The marsh harrier (*Falco æruginosus*) is plentiful this year in the Queen's County, &c. Several specimens have been sent to Dublin. The peregrine falcon (*Falco peregrinus*), too, is not uncommon. An Iceland falcon (*F. islandicus*) came into the possession of the Natural History Society. The Merlin (*F. Æsalon*) is also common. The little auk (*Alca alle*) is numerous on the west coast.—*Id ; Bartragh, Dalkey, County Dublin, April* 5, 1863.

Peregrine Falcon (Falco peregrinus) *at Haverfordwest.*—I obtained on the 29th of last month a fine specimen of the peregrine falcon while still fresh and unskinned. It was captured near Haverfordwest by means of a bait poisoned with strychnine. The plumage in consequence is perfect, and is that of an old bird. I dissected the body, which is that of a female, and found the ovary in a very forward state, the largest egg being about half an inch in diameter. The stomach contained nothing but a few pieces of the poisoned meat. What a pity it is that so noble a bird is gradually becoming so scarce. I did not know until a few weeks ago that a peregrine was shot in this parish in January, 1862. I have recently seen the bird, which is stuffed and in the possession of a neighbour of mine, and I fancy from the size it is a female.—*J. E. Harting ; Kingsbury, Middlesex, April* 4, 1863.

Correction of an Error.—In my communication respecting the Dartford warbler (Zool. 8481), there is a misprint: the locality where I obtained the bird should be Bepton, not Beeston.—*Id.*

Blackbird Singing in February.—At Zool. 8484 the Rev. J. C. Atkinson mentions as a remarkable circumstance a blackbird singing in Yorkshire in February. Having noted for many years the first song of the blackbird, it is by no means uncommon in very mild winter for the blackbird to sing a few days in February, and once now and then at the end of January, but rarely. In my neighbourhood the first heard was about the 24th of February. In cold weather this bird is frequently silent until even the first or second week in March. The blackbird is also much later in nidification than his congener the song thrush, seldom commencing his nest before young thrushes are hatched. Many persons who have not correct ears for the song of birds, mistake the missel thrush for the blackbird. The missel thrush is a much hardier bird, and sings in colder and more tempestuous weather. The latter seems the only bird which delights to sing during a heavy gale of wind, when the other songsters of the grove are silent. The blackbird delights most to sing in a calm gleamy day, between warm showers.—*H. W. Newman ; Hillside, Cheltenham, April* 9, 1863.

The Query respecting the Robin.—I observe in the January number of the 'Zoologist' (Zool. 8326) that Mr. Whatt corroborates Mr. Ransom's statement as to the popular notion current in Yorkshire respecting the destruction of the old robins by their young, though he does not answer the query, "Are there any grounds for it?" but says, "Considering the advantages they enjoy they ought to be very common, and yet they cannot be said to be so." "There must be some cause or causes at work to keep down their numbers." "The question is what are those causes?" I would in the first place suggest, in reply to Mr. Ransom's remark, that it is unreasonable to suppose that the stronger birds should be killed by the weaker; even if attacked by numbers, having greater power of wing they would readily escape, and so unnatural too that the young should destroy the parent birds. As to the "young birds being common in June and July, and the old ones rare," I think it is readily accounted for. Allowing only four to a brood that would make two to one. And then we must recollect that the parent birds have to rebuild and rear another progeny before reappearing in our gardens, another reason for redbreasts being very rare indeed in June and July. Though Mr. Whatt seems at a loss to account for its not being a more numerous species, the reasons I think are obvious. First, their greater tameness and familiarity render them an easy prey to cats; secondly, being a tender and sparsely-feathered species many perish of a severe winter, particularly in the Northern Counties. That the robin should be less numerous than the hedgesparrow in the North is not surprising. During a year's residence in Morayshire I do not remember seeing one in the garden, though sheltered and well stocked with trees, but I occasionally met with it in my rambles. In most parts of France the robin is scarce, though the climate is more favourable, but there it is preyed on both by man and beast. In the south of France I have seen strings of them exposed for sale in the markets.—*Henry Hadfield; Ventnor, Isle of Wight, January* 17, 1863.

Early Occurrence of the Swallow.—In a letter from a near relative, residing a few miles from Boston, in Lincolnshire, dated April 1, 1863, the occurrence of a swallow is thus mentioned:—"A swallow was found one day a week ago in the swill-pail set at the back-kitchen door. A piece of beef had been boiled, and the liquor had been poured out into the pail. The swallow appeared to have fallen into the hot liquor. It was alive when found, though it died shortly afterwards. Where did it come from? Was it an early and exhausted arrival which fell from weakness after reaching the house?"—*J. C. Atkinson; Danby-in-Cleveland, April* 7, 1863.

The Sandpiper a Diver.—Mr. Blake-Knox says (Zool. 8493) that in mentioning the diving of the sandpiper it was "simply as a fact hitherto little known." The mere fact of the wounded bird endeavouring to effect its escape by diving may be interesting and worthy of note, but in itself proves nothing as to the habits of birds of that species in a natural and healthy condition, though your correspondent seems to think otherwise, for he refers to "habits hitherto generally unknown being added to the life-histories of these interesting birds;" then remarks, to prove my observations "rather inconsistent," "When a bird can dive for safety, can it not also dive for other reasons—food or pleasure?" Undoubtedly it could, but whether it would, or, rather, has occasion to do so, is the question. That it is not the sandpiper's usual habit to seek for food at the bottom of streams or pools there can be little reason to doubt; and as to its taking pleasure in it, I am inclined to believe that it only dives when winged and pursued, having no other way of escape. And if proof were wanting of its diving not being habitual or natural it might be found in the fact that a man of Mr. Blake-Knox's experience of the species never yet saw a sandpiper dive except when wounded. He says, "My chief object in writing my first paper was to learn from correspondents if the bird was known to dive for food. My supposition seems to have been satisfactorily confirmed by Mr. Leven's paper, and again by the Rev. G. C. Green." By a reference to their notes, however, it would appear that Mr. Blake-Knox is easily satisfied. As to Mr. Green's statement (Zool. 8283) it merely amounts to this: that he, too, has seen a wounded sandpiper dive; but this your correspondent seemingly considers "satisfactorily confirming his supposition," though his "chief object was to learn if the bird was known to dive for food." The fact is, that the Rev. G. C. Green, Mr. Blake-Knox and myself can merely certify to having seen wounded sandpipers swim and dive,—not for food, but to escape capture; consequently it can hardly be said that we have "added much to the life-histories of these interesting birds." No; the credit—if credit there be—belongs of right to Mr. Leven, as he alone has observed the diving of the unwounded bird. Let us then see what facts are to be gleaned from his short note. On a careful reperusal of it, all I can gather is this. That he once, as he seems sure of no more, saw a sandpiper dive when amusing itself on the shore or bank of a stream. But it may be as well to quote his own words (Zool. 8237):—"I have noticed it often dive when wounded, and on one or two occasions while the birds were amusing themselves on the shore or bank of a stream. Whether they were after food or not I cannot say." I would likewise call attention to the following sentences:—"I have seen them dive four or five feet deep, and that not by plunging in. but from the surface;" and he adds, "I never saw one swimming on the surface unless wounded." Opportunities seldom offer for a close inspection of birds of this species, except during the breeding season. I have then seen them perch on a rail or fence within a few yards of me, and have had to drive them away to prevent their seeing me approach their nest. But on one occasion, when residing on the north-east coast of Scotland, on rowing out to the beacon rock, about two miles from the harbour of Lossiemouth, I found, about noon, on a calm winter's day, an innumerable flock, or rather assemblage or combination of flocks, of sandpipers awaiting the receding of the tide. There they sat, apparently unconscious of danger, allowing us to row within a few yards of them without one taking wing. By far the greater part were sleeping or reposing on the shelving rock, but many with outstretched wings were preening their feathers; others were standing or reclining on the outer edge or margin of the rock, basking in the sun; and numbers were to be seen playing or sporting about in the shallow water or pools, but none diving, though they may have ducked or dipped for a second or two without my attaching much importance to it. We had a gun with us, but they were not shot at or otherwise disturbed. Unless by some such chance Mr. Leven could hardly have got within thirty or forty yards of a flock, and at that distance it would be difficult to see or make out whether the birds might be dipping or diving, but as they were on the "shore or bank of the stream," *i. e.* in shallow water, the former is the most likely. What we want is to hear something of the habits or life-history of the unwounded birds. As to the swimming of land birds I am aware that even a barn-door fowl, when scared, will fly into or take refuge in a horse-pond, and float. In that way, doubtless, land birds swim, but I have yet to learn that they can generally "propel themselves through the water by their feet," though they may flutter on for a time, but their plumage—unlike that of the waterfowls—being unanointed would soon be saturated, when they would drown of course. Wounded or hunted animals it is well known often take to the water. The cat, though by no means amphibious, will do so. I have seen one swim across a large pond. However, in a wild state it is not unlikely that it may occasionally prey upon fish, seeing how partial the domestic cat is to that food.

In describing the sheep I should not say, for instance, that its habit is to throw itself headlong down a precipice, after the manner of the ibex, though I have seen one do so when pursued, and strangely enough it was none the worse for it.—*Henry Hadfield; Ventnor, Isle of Wight, April* 7, 1863.

Bite of a Poisonous Snake cured by Ammonia.—As I was riding on the morning of the 14th of January from Kopeigaur to Yeola (two villages in the Ahmedungger Districts, Bombay Presidency), I saw a man carrying a load on his back, and on seeing a woman who was passing at the time seize hold of it I perceived that it was a boy about eighteen years of age, and on asking him what was the matter he replied that the boy had been bitten by a snake early in the morning (this was about half-past nine), and that he believed the boy to be dead. I got off my horse and felt the boy's pulse, but could not feel it beat. The man at my direction put the boy down; then the body was quite motionless and the limbs deathly cold. I applied a bottle of carbonate of ammonia (that I have always carried about in my pocket since my dog was bitten by a cobra about two months before, and died in seven minutes after being bitten) to his nose; in about two or three moments I saw his head shake. We then forced open his teeth, which were clenched tight together, and I put a piece of this ammonia into his mouth. He very soon began spitting it out, when I put in a second, third and fourth piece. In a quarter of an hour he was so far recovered that with the assistance of two men he walked some three hundred yards. This occurred near Yeola, where I met a native official. On my asking him whether he had any spirits of ammonia, which is supplied by Government to these native officials in cases of snake bites, he sent to his office to see, when a man brought me a bottle. I then administered a dose or two of it in water to the boy, and after an hour he was so convalescent that he opened his eyes and looked about; though he remained speechless, still he appeared to notice what was said to him. I may mention that at first, on forcing up the eyelids, the whites of his eyes were perfectly yellow. The natives could not tell me what sort of snake it was that had bitten him, and though no doubt a venomous one it could not have been a cobra, otherwise all remedies so long after the boy had been bitten would have been inefficacious.—*Julian Hobson; Ahmedungger Districts, Bombay, February* 12, 1863.

On the Breeding of Salamandra maculosa in Captivity.—Seeing a paragraph in the March number of the 'Zoologist' (Zool. 8449), relative to the above reptile I send a few notes concerning the breeding of this wonderful creature. Not knowing any external difference between the male and female Salamandra I cannot answer the question of sex referred to by your correspondent. I have had two of these curious reptiles, but both were females which I purchased two years ago. For four months or more they both refused food, and I was afraid they would soon die, but not so, for after this time had elapsed, they began to feed upon the common garden worm, taking two or three large sized ones at a meal, and they have fed on them ever since, and are remarkably fat and well. The man from whom I purchased these told me they would have young very soon, for which I eagerly looked forward for two or three months, after which I gave up all hopes, but at the end of eleven months one of them gave birth to five or six little ones, thus showing that the reptile is viviparous and not oviparous as many people fancy. As she was neglected, of course these died. She had in all twenty-eight or twenty-nine young ones, but as I did not know how to manage them I lost them all. My second salamander had twenty-eight young ones about a fortnight after the *accouchement* of the first. The salamander takes to the water to bring forth her young, and after producing six or seven leaves it. During this period the young ones must be removed, or the mother will very likely eat them. They must be fed as soon as possible after their birth, or they will attack one another. The young, when removed from the mother, should be placed in a shallow pan, with some shingle arranged on one side, so that they may get upon it for air, and the depth of water should not exceed an inch or an inch and a half. The food I brought up my young upon was either raw mutton or beef, which they ate most ravenously; pieces the size of a pin's head only should be given to them at first, but after a fortnight they will take pieces cut lengthwise, thin and about the size of a small worm. Their form is like the mother, excepting that they have flat tails and fluffy gills, which disappear when they are about to leave the water. They change their skins constantly, and at about four months old they change and become the colour of the mother; before their change, however, they are almost transparent, excepting where the dark spots are visible. Out of the twenty-eight young, unfortunately only fourteen were born alive, the reason I fancy being in consequence of my having moved the mother from a large fern case with a tank in it to a smaller one with only a small quantity of water, for the whole time she was in the small case, which was about a week, she never had any more young ones, but after I put her back into the large case, the very next day I found four dead and two or three living; the remainder were born (some living and some dead) on the next day. I forgot to say that she had six or seven in the large tank before I removed her: my reason for moving her was that I was afraid the frogs, toads, triton or water tortoise which I keep in the case might attack and eat the young ones as they were born. These fourteen that were born alive I managed to rear in a milk-pan, giving them fresh water every day and washing the shingle. They were fed every day. Six of them I lost by their crawling up the side of the pan when ready to leave the water, and, although search was made all over the room, nothing could be found of them; one died, and the rest I have still alive. They are very healthy, and are fed upon small common garden worms, for they reject the meat after they leave the water. Their growth is very slow, for mine are now more than twelve months old, and they only measure two and a half inches from the nose to the tip of the tail. Their colour is like that of the mother, as I said before, but brighter, and the spots are different in all but two; one is striped with four stripes, two yellow and two black, the others are spotted in different ways. A curious fact concerning my salamanders is that they were very large when I bought them, and have kept about the same size ever since, and even after they had had their young did not appear any smaller; they have refused food all the winter and yet are about the same size.—*Thomas Lendon Merriman; 27, Sutherland Place, Bayswater.*

A Viviparous Fish.—The 2nd of May, 1859, finds us at anchor in the safe and pretty port of Mah-lu-san. In the afternoon I accompany the seining party. The day is lovely; the whole face of the country is bright and smiling; the barley is ripe in the fields, the hills are covered with a varied green, and the little rippling waves of the clear water of the bay are dancing in the sun. Stretching far away to the north and to the south are groups of dark blue islets rising mistily from the surface of the sea,—glimpses of that mysterious archipelago, among the unknown islands of which I cruised in bye-gone years. Large picturesque boats crowded with Koreans, in their white fluttering robes, are putting off from the adjacent villages and skulling across the pellucid water to visit the stranger ship. And now we choose a sheltered bay, and commence paying out the seine. Koreans seated in groups, bare-headed or wearing their broad-brimmed hats, smoke their pipes in silence. The rooks, in the tall and glorious trees that fringe the bay, caw loudly with indignant remonstrance at the unwonted intrusion upon their quiet haunts, while the sailors, to the tune of their popular songs, haul in the great net. Upwards of 170 pounds of bream and other fish are taken. There are also toad-fishes and devil-fishes, sea-horses and swimming-crabs, and among these I notice a great many individuals of a singular oviparous fish, most of which have three or four living young ones in their bellies. I believe the fish belongs to a genus described by Temminck under the name of Ditrema. As I stroll away from the seining party, I meet with a singular species of Arum, with long curling horns extending from its lurid spathes. I find the natives just as friendly as when I visited the group in 1845. An old man, with a basket of sea-weed on his back, stops and would fain persuade me to taste of his Laminarian dainty; a little further on, a young lad makes a friendly advance by biting off a portion of lily-root, offering me the remainder; while a little boy brings me wild raspberries strung upon a straw.—*Arthur Adams.*

On the Supposed New British Mygale (Zool. 8172 and 8202).—I had expected that Mr. Robertson would have before this corrected the error into which he fell in his notice of Dysdera erythrina as new to Britain (Zool. 8172). After some correspondence with Mr. Robertson on the subject (during which he had the opportunity of comparing his specimen with specimens of D. erythrina captured by myself), he seemed to have no doubt that his specimen was of that species, and consequently was a well-known British spider for years before his discovery of it at Brighton.—*O. Pickard-Cambridge; Bloxworth, Dorset, March* 31, 1863.

Species of Micropteryx Bred.—During the present month I have had the pleasure of breeding the following species of this genus:—

Micropteryx purpurella. Bred freely from whitish larvæ with brown heads and green dorsal vessels, mining the leaves of birch, in May last.

M. salopiella. I have bred several of this species from whitish larvæ with dark brown heads and darkish dorsal vessels, feeding in birch leaves during May.

M. semipurpurella. I bred a single example of this species along with M. purpurella.

M. subpurpurella. This I have also bred from whitish larvæ with dark brown heads, the second segments being dusted with darkish; these larvæ fed on oak leaves in May last.

I have tenanted cocoons of two other kinds of Micropteryx larvæ, the imagos of which I am expecting every day to make their appearance. It is fatal to the larvæ to allow them to spin their cocoons and remain for any length of time in sand, as they are almost sure to dry up; the quantity of cocoons containing dried-up larvæ in my possession fully convinced me of the impolicy of such a course. The plan I adopted last May was, having first carefully separated the various larvæ, I put a mixture of one part of sand to two of mould at the bottom of each jar, into which, when full fed, the larvæ retired and spun their cocoons. When they had all constructed their cocoons I placed them along with the mould and sand in small flower-pots, on the outsides of which I painted a number corresponding with that in my diary opposite the description of each larva. I then buried them in the garden, and at the end of February last brought them indoors.—*Charles Healy; 74, Napier Street, Hoxton, March* 30, 1863.

Pyriform Cocoon of Saturnia Carpini with two Tubes.—My friend Mr. Doubleday has just sent me a cocoon of the emperor moth with two holes side by side at that part where the caterpillar usually emerges; both these are much smaller than the one usually present: the pupa is alive, and in all respects of the usual form and size.—*Edward Newman.*

Occurrence of Ennomos alniaria at Brighton.—In the beginning of September last I caught at light, in Kemp Town, Brighton, a female specimen of Ennomos alniaria. Not recognising it I put it aside, intending to determine the name at some future time. On Thursday, April 16th, on showing it to H. Pratt, of that town, he recognised it immediately, and his opinion has since been confirmed by other competent persons. This specimen, which is damaged in the tip of one of the fore wings, was taken close to the Hospital, in which some years ago a specimen was taken.—*J. R. Griffith; Oriel College, Oxford.*

Note on the Larva and Food-plant of Eupithecia debiliata.—Some little time since I had a very interesting letter from Dr. Breyer, of Brussels, who has for the last year or two been devoting himself to the study of the economy of the genus Eupithecia. He makes the following remarks on the larva of Eupithecia debiliata, which will, I am sure, be interesting to the readers of the 'Zoologist':—"I took the larva in the early spring (May, I believe,) on Vaccinium myrtillus. It is pale green, and lives between united leaves like the larva of a Tortrix. There is not generally more than one larva on each plant. When you have found the first, and got your eye in, it is not difficult to find several more." I hope all entomologists who live in localities where Eupithecia debiliata occurs will try and get their "eyes in" during next month. I am afraid I shall not have the chance of doing so myself, but shall only be too glad to hear the result of the ocular investigations of others.—*H. Harpur Crewe.*

Occurrence of Notodonta Carmelita at West Wickham.—Entomologists will do well to keep a bright look-out for this rarity: a specimen, evidently fresh out of the chrysalis, was taken on the Archbishop's palings on the 19th of April: this is the first I have heard of: it will probably continue to emerge for the next fortnight.—*Edward Newman.*

A Noctua new to Britain.—A few weeks since, the Rev. Henry Burney sent me a male and female of a Noctua to examine, which were taken in Wales last summer. I saw at once that the species was new to Britain, and had little doubt that it would prove to be Luperina Desyllesi, which I saw several years since in Dr. Boisduval's cabinet. I obtained photographs of the two sexes, and sent a print to M. Guenée and also to Dr. Staudinger, of Dresden. The former wrote immediately he received my letter, and said that, although he did not like to give a positive opinion without seeing the insect itself, he believed it was L. Desyllesi, a species of which but very little is known. Dr. Boisduval's specimens were taken near Havre. Soon after I received a letter from Dr. Staudinger, who said it was a species which he did not possess, but was most probably L. Desyllesi or L. Nickerlii. At the request of the Rev. H. Burney I have written these few lines for publication in the 'Zoologist,' but the identity of the Welsh insect with L. Desyllesi cannot be proved till they have been compared.—*H. Doubleday; Epping, April* 18, 1863.

Description of the Larva of Phlogophora meticulosa.—When touched or annoyed it feigns death, turning its head on one side until it touches the side of the body, and I have sometimes seen this larva form a compact ring. Form somewhat leach-like, the head small, the 2nd, 3rd and 4th segments gradually larger, those following much larger, the 12th gibbose, but not humped on the back: smooth, velvety. Colour of the head pale obscure green, semihyaline, reticulated with darker lines: colour of the body apple-green or olive-brown: in either case it is densely sprinkled with very obscure whitish dots; there is an interrupted, very narrow median white line on the back, and a broader obscure whitish line on each side, just below the spiracles, better defined on the 12th and 13th segments, and terminating in the anal claspers; the spiracles are whitish, surrounded by a delicate black line; the legs and claspers semihyaline-green. Feeds on Senecio vulgaris (groundsel), the cultivated Chrysanthemums, Primula vulgaris (primrose) and a variety of low-growing herbs. I am indebted to my friend Mr. Doubleday for a supply of these larvæ; they fed throughout the mild winter of 1862-3, and are full-fed now, at the end of April. It spins a slight web on the ground in April or May, and changes to a smooth brown chrysalis; the moths appear in May and June, and a second brood is out in September. The larvæ vary from bright green to olive-brown.—*Edward Newman.*

Amara brunnea, Gyll.—The claim of this species for a place among the British Coleoptera appears to rest on the following reference in Dawson's 'Geodephaga Britannica,' p. 127, "Stated by Mr. Haliday to have been taken at Portmarnoch, in Ireland, by Messrs. Tardy and Furlong;" since, although Stephens' description (Man. 38, 276) is apparently correct, the exponents of the species in his collection are wrong. Dawson (*loc. cit.*) mentions this circumstance, and refers them to his A. orichalcica, A. bifrons of Gyllenhal; but he also is in error, for, of the five specimens representing Amara brunnea in the Stephensian cabinet, the four upper insects are certainly A. rufocincta of Sahlberg, and are evidently the species considered as A. brunnea by Stephens, whilst the fifth only is A. orichalcica, a large dark specimen in a disguised condition. With reference, therefore, to the Irish specimens, on which Dawson relies, it appears, from enquiries I have made, that on the death of Messrs. Tardy and Furlong, their collections came into the possession of the Royal Dublin Society, from whom, in consequence of a circumstance hereafter mentioned, I have obtained the loan of one of Mr. Furlong's type specimens with the name "brunnea" attached, for which assistance I am much indebted to the courtesy of Messrs. Birchall, Dunlop and Wright. This insect is also decidedly Amara rufocincta of Sahlberg, a species not included in Dawson's work, but added subsequently by him in one of the Entomological Annuals. My attention was drawn to the matter by seeing the species marked in a list of Geodephaga belonging to Mr. E. Graham, of Preston, and, on my asking for some explanation as to its identity, &c., that gentleman kindly lent me his specimen for examination, informing me that he took two examples at Preston, which he sent to Mr. Dawson for his opinion, not being able to name them satisfactorily from the 'Geodephaga Britannica,' and of which one was returned by the latter as the Amara brunnea of his work. Mr. Graham also told me that it had been so named by another authority. This insect also is certainly A. rufocincta of Sahlberg, which occurs sparingly all over the kingdom, having been taken at Scarborough, Dublin, Preston and Deal, and in the Reigate district. As there could be no doubt about these specimens I was induced to examine the characters of A. brunnea as given by Dawson (*loc. cit.*), and find that although the Latin diagnosis evidently refers to that species, being nearly *verbatim* the same as that in Erichson's 'Käf. Brand.' 95, 29, yet his English description applies equally to A. rufocincta and A. brunnea, except in referring to the thorax, which he mentions as having the sides "nearly straight, or very slightly sloped inwards towards the base;" this can only apply to the former, the thorax in A. brunnea having the sides most decidedly rounded behind. Judging, therefore, from the specimens I have examined, and from the differences in the description above referred to, I can come to no other conclusion than that Dawson adopted the Latin diagnosis from Erichson, and that his English description is that of A. rufocincta. The species A. brunnea of Gyllenhal must, therefore, be expunged from our lists, and A. brunnea of Dawson (Geod. Brit., *et exempl.*) added as a synonym to A. rufocincta of Sahlberg. The true A. brunnea comes nearest to A. rufocincta, but still differs from it conspicuously as follows:—It is altogether a smaller and less robust insect; the joints of the antennæ are more slender, the legs shorter and more slender, and the tarsi especially shorter; the thorax is not so ample, having the anterior angles rather more acute, the posterior angles contracted behind and decidedly rotundate, the basal foveæ not so deeply punctured, and the reddish edging more evident, especially on the hinder margin; the scutellum is rather deeper and not quite so broad; the elytra are more parallel, and not so acuminate behind. I have not only examined the insects above referred to with the original descriptions, but have compared them with an undoubted specimen of A. brunnea sent by Dr. Schaum to Mr. Waterhouse.—*E. C. Rye.*

Characters of a Geodephagous Insect new to Britain.—

> BEMBIDIUM MANNERHEIMII, *Sahlb. Ins. Fenn.* i. 201, 26 (*Schaum, Er. Ins. Deutschl.* iv. 740, 66). B. unicolor, *Chaudoir, Bull. d. Mosc.* 1850, iii. 176, 10. B. guttula, *var.* β, *Dawson, Geod. Brit.* 181? (*nec* Philocthus hæmorrhous, (*Kirby*), *Steph. Ill. Man. or Coll.*

Above are the references of a species to be added to our list of Geodephaga. It is one of the sub-genus Philocthus, and closely allied to B. guttula, *Gyll.*, having the posterior angles of the thorax subemarginate, but differs from that insect in having the elytra shorter, more convex, more decidedly oval (they are oblong-ovate in B. guttula), and without any red subapical spots, the extreme apex only being sometimes of a faint reddish tone; the thorax is broader, with the sides more rotundate, and the basal foveæ not extending quite so far upwards; altogether it is a shorter, broader, more convex insect, bearing a slight superficial resemblance to dark examples of Trechus secalis. In colour also it differs from B. guttula, being deep black, with a faint purplish tinge, and never exhibiting any æneous tendency. Taken at Hammersmith Marshes and Hampstead by Mr. Waterhouse and his sons, Mr. H. Montague, and myself: I have no doubt, however, that it will be found mixed up generally in collections with

B. guttula. Dr. Schaum (*loc. cit.*) gives Philocthus hæmorrhous of Stephens as a synonym of this species; but the description in the 'Illust. Mand.' ii. 9, 6, "elytra oblong-ovate, apex pale pitchy," and also in the 'Manual,' p. 53, decidedly refers to B. guttula, in which the subapical spots are sometimes suffused; and in neither case does Stephens allude to the differences in structure. In addition to this, the Philocthus hæmorrhous of Stephens' collection is represented by four pinned specimens, whereof the first and third are Bembidium (Tachys) obtusum; the second is B. (Philocthus) guttula; and the fourth, which stands below, is also B. guttula. The three upper insects are not marked in any way, but the fourth bears an old ticket attached to the pin (and apparently in Kirby's handwriting), on which the name B. hæmorrhous appears; this certainly does not belong to the species of which I have above given the leading characters, but is, as just stated, a specimen of B. guttula, in which the subapical testaceous spot is very distinct; and in which the whole apex of the elytra, below the spot, is fusco-testaceous. The elytra are thrust open by the pin with which the insect is pierced, and hence the light passing through their semitransparent apical portion causes that part to appear paler than in other specimens of the same species with their elytra in the ordinary position. Mr. Waterhouse has examined these specimens, and, without being aware of my conclusions, has arrived at precisely the same results. It seems to me doubtful whether Dawson's *var. β* of B. guttula can with certainty be referred to B. Mannerheimii, for, although he mentions the rounder sides of the thorax and unspotted elytra, he still refers it to P. hæmorrhous, *Steph.*, which must be incorrect for the reasons above given. The subapical spots in B. guttula vary much in size, sometimes existing only as the faintest possible indication of lighter colour, and at others reaching downwards until they meet the light edge of the extreme apex.—*E. C. Rye; 284, King's Road, Chelsea, S.W., April* 6, 1863.

Food of Phryganidous Larvæ.—In the current 'Zoologist' (Zool. 8463), Mr. Newman, in a note on the subject of the destruction of salmon ova, takes occasion to express his doubts as to the complicity of Phryganidous larvæ in this destruction, and remarks that he thinks that "all the Phryganidous larvæ are vegetable feeders." I have myself not had much opportunity of watching these insects in their larva state, but may be permitted to state the opinion of M. Pictet on the subject, than whom no one is better able to give his experience, no other entomologist having been equally successful in rearing these insects. At pp. 113, 114 of his 'Recherches pour servir à l'Histoire et l'Anatomie des Phryganides,' he states that "The larvæ of Phryganidæ are in general herbivorous. I have always fed them on willow-leaves, and all those that have cases have eaten them willingly. The large species eat all the leaf, commencing at the edge; but the small species are not able to do this, and content themselves with cutting the parenchyma, leaving the nervures intact. Moreover, almost all the larvæ of Phryganidæ eat other aquatic insects when they find occasion to do so, and they will even attack larvæ of their own kind (*leurs pareilles*) when these are deprived of their cases. I have sometimes seen them in captivity kill larvæ enclosed in cases when these offered little resistance. Their blunt mandibles only permit them usually to eat the soft part,—that is to say, the abdomen; they leave the head, corselet and feet intact. They are more or less voracious, according to their size; they are able, however, to live a long time without eating. I have kept them often in winter without giving them any food; they have lived several months without appearing to suffer in any way from this privation, and have even undergone their metamorphoses." After such testimony as this, I think we cannot for a moment doubt that these larvæ are both carnivorous and herbivorous, and I should think it not at all improbable that the ova of fishes may occasionally serve them for food, and perhaps even the newly-hatched fry. In conclusion, I may remark that I think the term "stone-fly" is generally applied to the Perlidæ, as distinguishing them from the "caddis-flies" or Phryganidæ.—*R. M'Lachlan; 1, Park Road Terrace, Forest Hill, April 6, 1863.*

Food of Larvæ of Phryganidæ.—Since writing the above I have had an opportunity of witnessing an interesting instance of the herbivorous propensities of these larvæ. A few days ago I was in Richmond Park, and found a large number of caddis-worms (some species of Limnephilus) congregated about the rushes on the edges of a pond. On closer inspection it was evident that they were feeding on the bark of the rushes, sometimes eight or nine cases being attached to a single rush that was bent and lying on the surface. After having devoured the bark some of them cut the pith into short lengths, which they attached to their cases.—*Id.; April* 15, 1863.

Singular Caddis-Worms at Fat-si-jien.—Fat-si-jien is a small island in the Pacific, one hundred and fifty miles from the east coast of Niphon. It is a penal settlement of the Japanese. On landing in a little bay among rocks and rollers, we find the people mild, hospitable and well-behaved. Their place of banishment is by no means inviting, and their lives must doubtless be hard, while their luxuries must certainly be few. Notwithstanding the stony nature of their island they manage to cultivate two kinds of rice, and, with great industry and toil, they also grow the sweet potato and the taro. At the base of the island the huge waves of the Pacific come rolling in, rounding all the rock-fragments, which continually fall from the cliffs above. The greater part of the island is barren, or clothed with a useless scrub. The sandstone rocks here and there crop out, and are sometimes red and sometimes clothed with a scanty verdure, while deep chines and fissures, wall-faced cliffs and great angular ridges meet the eye at every turn. Hardly a bird but the rook is seen, and the only animals observed among the herbage are a smooth glistening skunk and a slim brown lizard, gliding and rustling, as is their wont, among the leaves and grass. Waterfalls of various shapes and sizes everywhere abound, the humid rocks about them covered with Marchantias, ferns, Sedums and Saxifrages. Under the rush of these waterfalls, adhering like limpets to the surface of the rock, I find my singular caddis-worms. Their singularity consists, not only in their peculiar habitat, but in the adaptation of their tubes to meet the deviation from the usual habits of their race. In running streams they are cylindrical, but here they are arched above and flat beneath, another form of tube being necessary to enable them to resist the action of the falling water. They are about half an inch long, and composed of small grains of sand cemented together. Their occupant does not appear to differ in appearance from the architect of the ordinary English form of tube with which, as a school-boy, I was formerly familiar.—*Arthur Adams.*

Larvæ of Lepidoptera.—Once more I beg to solicit readers of the 'Zoologist' to send me living specimens of the larvæ of Lepidoptera: the great harvest of night-feeding larvæ is during the month of May; and although it is uncertain when the descriptions can appear, there is no reason they should not be written while the insects are obtainable. Tin or brass tubing, closed at the ends, is the most convenient vehicle for the transmission of living larvæ.—*Edward Newman.*

Proceedings of Societies.

ENTOMOLOGICAL SOCIETY.

April 6, 1863.—FREDERICK SMITH, Esq., President, in the chair.

Donations.

The following donations were announced, and thanks ordered to be returned to the respective donors:—'Proceedings of the Royal Society,' Vol. xii. No. 54; presented by the Royal Society. 'Journal of the Proceedings of the Linnean Society,' Vol. vii. No. 25; by the Society. 'The Journal of the Royal Agricultural Society of England,' Vol. xxiv. Part. 1; by the Society. 'The Entomologist;' by James Bladon, Esq. 'Exotic Butterflies,' Part 46; by W. Wilson Saunders, Esq. 'The Zoologist' for April; by the Editor. 'The Intellectual Observer,' No. 15; by Messrs. Groombridge & Sons. 'The Journal of the Society of Arts' for March; by the Society. 'The Athenæum' for March; by the Editor. 'The Reader' for March; by the Editor. 'On the Composition of the Head, and on the Number of Abdominal Segments in Insects;' by the Author, Dr. H. Schaum. 'Latreille, Familles Naturelles du Règne Animal;' by F. P. Pascoe, Esq.

Election of Honorary Members.

Professor Lacordaire, of Liège, Dr. Leconte, of Philadelphia, and Dr. Hagen, of Königsberg, were severally ballotted for and elected Honorary Members.

Exhibitions, &c.

Sir John Hearsey exhibited a box of Indian Lepidoptera, all having ocelli on their wings.

Mr. Waterhouse exhibited a specimen of a new British species of Aleochara, from the collection of Mr. Jeakes; it was in all probability captured by Mr. Squire, but there was no note of its locality, further than that the specimen was a British one. The insect was as large as a middle-sized A. mœsta, and was most remarkable for the unusually long terminal joint of the antennæ, this joint being equal to the three preceding joints taken together. It was glossy black, and rather densely clothed with very pale ash-coloured pubescence, especially on the thorax and elytra; the legs, palpi and basal joints of the antennæ were pitchy, the terminal joint of the palpi and the tarsi testaceous. The head presented very fine and scattered punctures. The antennæ were longer and less stout than usual; the second and third joints considerably elongated, the third being a trifle longer than the second; the fourth joint fully as long as broad; from the fifth to the tenth joints there was no perceptible increase in the width, but those joints gradually became shorter, the tenth joint was, however, but slightly transverse; the much-elongated terminal joint was cylindrical, with the apex rounded. The thorax was finely but not very thickly punctured, and presented two or three delicate setæ at the sides. The elytra taken together were more than one-third broader than long, slightly tinted with piceous behind, thickly punctured and faintly rugulose on the inner side. The abdomen had the transverse grooves on the basal segments strongly and thickly punctured, and on the apical half of those segments, as well as on the terminal segments, were finer scattered punctures: the penultimate segment had the hinder margin rather indistinctly emarginate in the middle, and was simple, not crenulated. Compared with A. mœsta, this insect differed in the following points:—the head was smaller; the antennæ longer and more slender; the thorax less convex, more contracted in front, and more delicately punctured; the abdomen not only differed in the strong and rather dense punctuation of the transverse groove of the basal segments, but this strong punctuation existed even on the basal portion of the fifth segment, which in A. mœsta has the corresponding part smooth. The legs were slender, as in the species last mentioned; in A. lanuginosa the legs are stouter, and the posterior tarsi are shorter and stouter. The Aleochara inconspicua of Aubé is described as having a remarkably long terminal joint to the antennæ in the male sex, and as having the transverse grooves in the abdominal segments strongly punctured, and so far agrees with the insect exhibited, but the latter was larger than the size indicated for A. inconspicua, and the penultimate abdominal segment was not crenulated; hence Mr. Waterhouse was not inclined to identify it with A. inconspicua without a note of doubt.

The President exhibited specimens of Claviger testaceus found near Purley and Croydon in the nests of Formica flava; they had readily sucked sugar and water supplied to them in blotting-paper, and he had hoped to have exhibited them alive, but all had unfortunately died before the hour of meeting. He had not been able to find the larva of Claviger; so far as his experience went C. testaceus was confined to the nests of Formica flava, but in the course of last year his son had found it at Folkestone in the nests of the common garden ant.

Mr. Haward had found it in the nests of both these ants, but more commonly in that of F. flava.

Mr. Lubbock requested entomologists to supply him with specimens of the larva or imago of Acronycta Psi and A. Tridens, as he was desirous of making experiments in breeding and interbreeding those species.

The Secretary read an extract from a letter from Mr. Roland Trimen, dated Cape Town, February 18, 1863, in the following words:—

"Is it known that Deilephila Livornica is a *day*-flyer? In December last I saw several specimens flying about a long hill-ridge in the hot mid-day sunshine, and captured one of them. One specimen was hovering about the blue flowers of a species of Echium."

The Secretary also read a letter received from Mr. C. A. Wilson (a Corresponding Member of the Society), dated Kensington, near Adelaide, January 27, 1863, in which the writer gave a brief account of the successful passage, over the continent, to the north-west coast and back, of the South Australian exploring party under Stuart. Two unsuccessful attempts had previously been made; and the successful party, consisting of ten persons, had endured great hardships from continued drought and the barrenness of the country. Mr. F. G. Waterhouse, one of the party, was about to publish his journal of the Natural History of the Expedition; but, considering the vast extent of country traversed, only a small number of objects of interest was found, most specimens being met with in the settled districts, or in places before partially known or explored. Mr. Wilson added that his own South Australian collection of insects numbered between 5000 and 6000 specimens, of which fully one-third were Coleoptera, and he was gradually adding to them those of other colonies.

Mr. Benjamin T. Lowne (who was present as a visitor) exhibited specimens of thirty-three species of ants from Port Jackson, Australia, which he had collected during October and November last. The collection was entirely made in the immediate neighbourhood of Sydney; and so far as he had then been able to ascertain, eighteen of the thirty-three species were undescribed. Mr. Lowne had also been able, by personal observation of the nests, to unite four reputed species into two; Formica agilis, *Sm.*, and F. intrepida, *Kirby*, were (as was long ago suspected by Mr. F. Smith), the large and small workers of one species; and F. delecta, *Smith*, received from Hunter's River, was the female of F. purpurea, *Sm.*, a species received from Melbourne, showing that this interesting ant was distributed over a wide range of three hundred geographical miles, in which the fauna and flora varied considerably. The communities of Formica purpurea formed a nest very similar to that of our F. rufa, but built with small fragments of stone; near Sydney, where dark iron stone formed their building material, the hill was composed entirely of it; but in the mountains, where the rock was white, they carefully covered their hill with minute fragments of charcoal, which was very abundant in the Australian bush, a proceeding probably adapted to increase the internal temperature of their nest. As a rule, the nests of the genus Formica in New South Wales were subterranean, but one species excavated the hard boles of several species of Eucalyptus. The Australian Polyhachi did not, so far as Mr. Lowne's observations went, make a nest on leaves, like those of India, but excavated a domicile in the stumps of trees or under stones; whether those insects made any other nest at a later period in the year, he did not know. Crematogaster was a very numerous genus near Port Jackson, and, true to its character in Brazil and elsewhere, the species did not construct any nest, but lived under cracked bark and stones, or in the rotten stems of Xanthoreas. The Myrmecinæ were the most formidable looking of all the Australian genera, and armed with a sting which inflicted very severe but transitory pain. One species, M. nigrocincta, had the power of taking almost incredible leaps; it ran and leapt alternately, so that its progression was analogous to that of the Cicindelæ; although the ant was not more than an inch long, its leaps on ordinary occasions were about a foot in length, and when alarmed it had been seen by Mr. Lowne to leap a yard, rising a foot from the ground: he had been unable to discover anything in its structure to account for this remarkable power, which, however, was possessed by some other tropical ants.

Papers read.

The Secretary read a paper by Mr. Hewitson, entitled "Descriptions of two new Diurnal Lepidoptera," one of which belonged to the genus Papilio, the other to the genus Morpho.

The Secretary also read a paper by Mr. Roland Trimen, entitled "Descriptions of three new Species of Anthocharis, and a new Species of Pais, from Tropical South-Western Africa." They were described under the names of Anthocharis Regina, A. Phænon, A. Eosphorus, and Pais pulchra. Specimens of A. Regina and A. Eosphorus, which had been sent from Cape Town in a letter, were exhibited; A. Regina was a species of singular beauty, allied to A. Ione.—*J. W. D.*

TO CORRESPONDENTS.

I find it indispensable to issue a double number on the 1st of June: it will contain a notice, with copious extracts, of Mr. Bates' excellent new work 'The Naturalist on the Amazons'; paragraphs from Australian papers on the present existence of the Moa; descriptions of British Spiders, by the Rev. Octavius Pickard-Cambridge; Mr. Doubleday's reply to Mr. Greene on the name Lithosia molybdeola; and a variety of minor communications.

Notices of Mr. Jerdon's 'Birds of India' and Mr. Kirby's 'Manual of European Butterflies' are unavoidably deferred.

Many communications have reached me on the subject of enlarging the 'Zoologist'; these have been both numerous and urgent lately, but that given below, dated so far back as January 1, contains all the arguments adduced by later writers:—

'*Zoologist' enlarged.*—Thinking that the more frequent issuing of double numbers of late years, necessitated by the constantly increasing influx of correspondence, particularly from abroad, must be very perplexing to the Editor, already cramped for space,—to say nothing of the onerous charge entailed on him (the *regular* subscribers now getting some sixty or seventy additional pages for nothing),—I would suggest whether it would not be better to add some half dozen pages to each number of the 'Zoologist,' thereby insuring the immediate publication of all important matter, at the same time relieving the Editor of much anxiety and difficulty. The annual subscription to be proportionably higher; but the subscribers should bear in mind that they would still get their money's worth. This suggestion coming from one who has but a slight acquaintance with our worthy Editor may have the more weight.—*Henry Hadfield; Ventnor, Isle of Wight.*

In replying to this kind communication, I wish to be understood as replying to all of a similar purport. I may, then, state that I consider myself bound to the present price so long as the work is consecutively paged and appears with the same wrapper. The very large number who have adopted the mode of prepayment which I recommend, have nothing additional to pay for double numbers, and to these it would not only be unfair but impracticable for me to raise the price. Having considered the subject in all its bearings, I believe it right to make no additional change at present.

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Gentlemen wishing to subscribe to the above will please forward their Subscriptions s early as convenient to J. COCKING, Ranworth Fen, near Norwich, who will be appy to answer any inquiries respecting the above on receipt of an addressed envelope. —*Ranworth Blofield, Norwich, April* 21, 1863.

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